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Mammoth Cave Area Wastewater Facilities, Kentucky

(U.S.) Environmental Protection Agency
Atlanta, GA

Aug 81

U.S. Department of Commerce
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This Final Environmental Impact Statement addresses proposed wastewater facilities for the Mammoth Cave Area cities of Horse Cave, Cave City, Park City and Munfordville, Kentucky and the Mammoth Cave National Park. Eight wastewater management alternatives have been evaluated with particular attention to the sensitivity of the cave environment to wastewater discharges, the resource value and importance of the caves, the complexity of the area's subsurface hydrology and the financial impacts of the alternatives on the communities.

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PB82-143793

United States
Environmental Protection
Agency

Region 4
345 Courtland Street, NE
Atlanta, GA 30365

EPA 904/9-81-076
August 1981

Environmental Impact Statement

Final

Mammoth Cave Area, Kentucky

Wastewater Facilities

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

AUG 20 1981

TO: All Interested Agencies, Public Groups and Citizens

Enclosed for your review and comment is the Final Environmental Impact Statement (EIS) for proposed wastewater facilities for the Mammoth Cave Area cities of Munfordville, Horse Cave, Cave City and Park City, Kentucky and the Mammoth Cave National Park.

This EIS was prepared in compliance with the National Environmental Policy Act and implementing Agency regulations (40 CFR Part 6, November 6, 1979). In accordance with these regulations, the Final EIS will be filed with EPA's Office of Federal Activities. Availability of the EIS will then be announced in the Federal Register, beginning a 30-day comment period. This Agency will take no administrative action on this project until the close of the comment period.

We will appreciate your review of this document and any comments you may have. Please send all comments to John E. Hagan III, P.E., Chief, EIS Branch at the above address.

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Final
Environmental Impact Statement

for
Mammoth Cave Area, Kentucky
Wastewater Facilities

Prepared by
U.S. Environmental Protection Agency
Region IV, Atlanta, Georgia 30365

This Final EIS addresses proposed wastewater facilities for the Mammoth Cave Area cities of Horse Cave, Cave City, Park City and Munfordville, Kentucky and the Mammoth Cave National Park. Eight wastewater management alternatives have been evaluated with particular attention to the sensitivity of the cave environment to wastewater discharges, the resource value and importance of the caves, the complexity of the area's subsurface hydrology and the financial impacts of the alternatives on the communities.

Comments or inquiries should be forwarded to:

John E. Hagan III, P.E., Chief
EIS Branch
EPA, Region IV
345 Courtland St, N.E.
Atlanta Georgia 30365
404-881-7458

Approved by

John A. Little, Deputy
for Charles R. Jeter
Regional Administrator

8/6/81
Date

EXECUTIVE SUMMARY FOR ENVIRONMENTAL IMPACT STATEMENT

MAMMOTH CAVE AREA WASTEWATER FACILITIES

MAMMOTH CAVE AREA, KENTUCKY

Draft ( ) Final (X)

Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30365

Type of Action : Administrative Action (X)
Legislative Action ( )

EXECUTIVE SUMMARY

A. EXISTING PROBLEM

The Mammoth Cave Area in Central Kentucky contains one of the nation's leading natural resources, the Flint-Mammoth Cave System. This is the largest cave system in the world and serves as both a major tourist attraction and a living laboratory of cave flora and fauna. In addition to the Flint-Mammoth Cave System there are many other caves in the area which also serve as part of this natural resource and bear the same attention.

The cave biological systems are extremely sensitive to outside influences. Unlike surface systems, cave systems renew themselves very slowly or not at all if they are degraded by outside sources.

Much of the Central Kentucky Karst lacks surface streams. Therefore, the subsurface streams of the area have been used for wastewater disposal. Before there were any central wastewater collection and treatment systems in the area, the popular means of wastewater disposal was directly into the ground. This was achieved by discharging untreated wastewater directly to openings in the rock. Generally, this practice has been replaced by the use of septic tanks. However, because of soils, geologic formations and improper septic tank installation, much of the septic tank effluent drains directly into the sub-surface streams without proper treatment.

There are five major population centers in the study area. These include the municipalities of Munfordville (1980 population of 1,788), Horse Cave (1980 population of 2,019), Cave City (1980 population of 1,997), and Park City (1980 population of 603), and the proposed Staging Area at Mammoth Cave Park.* With the exception of Park City, these population centers maintain and operate wastewater treatment facilities. The disposal technique practiced by Munfordville and Mammoth Cave National Park is surface water discharge to the Green River. Treated effluent is disposed of in Horse Cave and City City, however, by direct discharge to adjacent sinkholes. The centralized collection and treatment systems of Cave City and Horse Cave in many ways compounded the problem by discharging large quantities of wastewater directly into the subsurface streams without any awareness of the eventual impacts. Once again it was an expedient solution to a difficult problem, which resulted in more far ranging problems. To compound this problem, plant performance at both Cave City and Horse Cave has been unsatisfactory. This has resulted in discharges of wastewater with poor treatment and is the reason for many of the problems which presently occur in the subsurface receiving stream, Hidden River.

Much of the problem at the Horse Cave treatment plant has been caused by industrial flows, which have seriously inhibited treatment capability at that facility. The treatment plant was designed as a biological treatment plant to provide secondary levels of treatment. However, heavy inflows of industrial wastes have hindered the biological treatment processes of the plant and has affected the quality of wastewater being discharged into the subsurface streams. These events have had significant impacts upon Hidden River.

Hidden River, which flows through Horse Cave has for many years caused significant odor problems in downtown Horse Cave. This is in contrast to the period from 1916-1944 when Hidden River Cave was a source of both recreation and water supply. Now, Hidden River is severely degraded, and the source of serious odor problems.

Problems in the area are further compounded by the proliferation of tourist related facilities, especially those along Kentucky, Route 70, which is a major entrance to Mammoth Cave National Park. Many of these facilities rely upon on-lot disposal systems. Additionally, Park City is served primarily by on-lot systems with approximately 80% of the residences and businesses discharging untreated wastewater directly to the subsurface. The remaining 20% have septic tanks which result in a direct discharge to the subsurface streams.

The major concern with the tourist facilities along Kentucky Route 70 and Park City is that they are in sub-surface drainage basins which flow into Mammoth Cave National Park and wastewater from improperly installed, operated, and maintained on-lot systems may affect subsurface water quality in and around the Park. Furthermore, the boundaries of the sub-basins are not fixed. They move in unknown ways depending on groundwater levels in the aquifer and on the flood stage of the surface rivers. This is caused by the filling of normally dry cave passages which may spill over into adjacent basins. This effect is particularly important with respect to Echo River Springs which is located in Mammoth Cave National Park. Under low flow conditions Echo River spring derives its water almost entirely from the region of Mammoth Cave Ridge and much of its catchment is within the National Park. Under high flow conditions, a spillover occurs at an unknown point and water from the Park City-Cave City area of the Sinkhole Plain flows under the ridges to greatly augment the flow of Echo River spring. This implies that pollutants introduced in the more highly populated part of the Central Kentucky Karst could be carried into the National Park, affecting aquatic life in the low level passages and even reaching portions of the cave close to those used by visitors.

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*These are 1980 Preliminary Census population figures.

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Efforts to develop wastewater management systems that are compatible with the area's sensitive natural resources must also consider the local economic climate and the ability of the community to successfully support a wastewater management system. In this regard the financial impact of the wastewater management alternative on the communities in the study area is an additional concern that is critical to this EIS.

B. DESCRIPTION OF ALTERNATIVES

This EIS was initiated in October, 1977. The focus of the EIS was to develop and evaluate wastewater management systems in the study area which would ensure the integration of environmental and economic considerations. During the development of the EIS certain issues were identified as more significant in developing and selecting a wastewater management alternative. These included:

1. The sensitivity of the cave environment to wastewater discharges.
2. Resource value/importance of the caves.
3. Complexity of the area's subsurface hydrology.
4. Financial impacts of wastewater management systems and funding options.

To address these issues eight wastewater management alternatives were generated in the EIS. These eight alternatives range from a regional management concept involving local treatment and joint disposal by all population centers (except for Munfordville) to local treatment and local disposal of wastewater at each population center.

Each alternative was evaluated with respect to cost, impacts on the natural environment and man-made environment and operability.

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From this evaluation three alternatives exhibited the greatest promise. A cost comparison of these three alternatives is presented below:

Alternative #	Project cost	Annual O & M	Net Present Worth
2	$10,574,000	$261,000	$11,620,000
5	6,546,000	230,000	7,975,000
8	5,876,000	249,000	7,630,000

Of additional concern in the evaluation of alternatives is the estimated user costs of the alternatives, and the local implications of these costs. These costs for alternatives 2, 5, and 8 for three of the communities are presented below:

Alternative #	Horse Cave	Cave City	Park City
2	$39/yr/EDU*	$68	$425-495
5	$40	79	145-165
8	$44	71	145-157

*Equivalent Dwelling Unit
NOTE: Horse Cave and Cave City existing user costs are not included.

Alternative 2

1. Description of Alternative 2:

This alternative involves the following components of a regional system:

- Local treatment facilities at each population center.
- Joint disposal of all effluent (except Munfordville) via surface water discharge (secondary treatment) to the Green River.
- Existing facilities at Cave City and Horse Cave would require upgrading.
- New facilities would be required at Park City and the Staging Area.
- Additional on-lot systems would be required at Munfordville.

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- An inter-city conveyance and disposal line would be required.

2. Pros of Alternative 2:

a. Provides greatest amount of protection for free flowing groundwater, groundwater supplies, sensitive cave systems and rare and endangered species by removing all wastewater discharges from the subsurface water network.

b. Corrects existing water quality problems in the Hidden River groundwater sub-basin.

c. Corrects existing odor problems in Horse Cave.

d. Exhibits greatest overall system operability (reliability, flexibility and maintainability).

e. Has received the support of the communities, environmental/conservation groups and the National Park Service.

f. Provides service to existing development along Route 70 (between Cave City and the National Park) and affords protection of sensitive areas from wastewater discharges.

g. Received a high rating with regard to natural and man-made environmental impact.

3. Cons of Alternative 2:

a. Has the highest net present worth cost.

b. The cost to Park City would be prohibitive unless other funding sources could be tapped.

c. The potential exists for development to be encouraged along Route 70. In this instance, non-point source problems could adversely impact area cave systems.

d. There is currently no multi-city or county sewer authority to implement this option. Local communities are, however, in the process of developing one.

e. Considerable construction activity is associated with the inter-city conveyance and disposal line (114,000 feet of gravity lines and force mains).

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Alternative 5

1. Description of Alternative 5:

This alternative involves the following components:

- Local treatment facilities at each population center.
- Joint disposal of Horse Cave's and Cave City's effluent via surface water discharge (secondary treatment) to the Green River.
- Existing facilities at Horse Cave and Cave City would require upgrading.
- Additional conventional and alternative on-lot systems would be required at Park City.
- Additional on-lot systems would be required at Munfordville.
- The Park's proposed Staging Area would employ on-lot systems.

2. Pros of Alternative 5:

a. Has the next to lowest net present worth cost.

b. Corrects the obvious water quality and odor problems in the Hidden River groundwater sub-basin by removing Horse Cave's and Cave City's sub-surface discharges.

c. As with #2 provides the greatest degree of protection of the groundwater system and cave environment for the Hidden River sub-basin.

d. Involves less than half of Alternative 2's construction activity for the inter-city conveyance system (approximately 51,000 feet of gravity lines and force mains).

e. When compared to #2, the local cost is significantly less for Park City, slightly more for Cave City and the same for Horse Cave.

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f. If the force mains from Cave City to Horse Cave to the Green River were designed to include flows from the Staging Area and Park City, this alternative could be the initial phase of what could eventually be a regional system to include Park City and the Park Service.

3. Cons of Alternative 5:

a. Existing residential and commercial developments now using on-lot systems in Park City and along Kentucky Route 70 would not be served. According to the Park Service's dye tracing studies these areas are drained by groundwater basins that flow through the Park. Although no problems have yet been detected, the potential does exist for the continued use of these on-lot systems to adversely impact these sensitive areas and the proposed critical habitat of the Kentucky Cave Shrimp within the boundaries of the Park.

b. The local cost to Cave City is slightly higher than #2.

c. System operability (reliability, flexibility and maintainability) is less than #2.

d. Although this alternative does address the water quality problems in Horse Cave and Cave City, it does not receive the support of the Park Service and other interests as does #2 because all sub-surface wastewater discharges are not removed.

Alternative 8

1. Description of Alternative 8:

This alternative involves the following components:

- Local treatment facilities at each population center.
- Additional conventional and alternative on-lot systems at Park City.
- On-lot systems at the Park's proposed Staging Area.

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- Cave City's existing facility would require upgrading for sub-surface discharge (advanced secondary treatment).

- Horse Cave's existing facility would require upgrading for surface water discharge (secondary treatment) to the Green River.

- Additional on-lot systems would be required at Munfordville.

2. Pros of Alternative 8

a. Has the lowest net present worth cost

b. Lowest local costs for Cave City and same local cost for Park City as in Alternative 5.

c. Removes Horse Cave's discharge from the Hidden River Sub-basin.

d. Least amount of construction activity for inter-city conveyance and disposal system (approximately 36,000 feet of gravity lines and force mains).

3. Cons of Alternative 8

a. Existing residential and commercial developments now using on-lot systems in Park City and along Route 70 would not be served. According to the Park Service's dye tracing studies, these areas are drained by groundwater basins that flow through the Park. Although no problems have yet been detected, the potential does exist for the continued use of these on-lot systems to adversely impact these sensitive areas and the proposed critical habitat of the Kentucky Cave Shrimp within the boundaries of the Park.

b. Cave City's sub-surface discharge would not be removed. The potential for the Hidden River sub-basin to be adversely impacted by wastewater discharges does exist.

c. This option is rated lowest concerning impacts to the natural and man-made environment.

d. This option is rated lowest concerning systems operability (flexibility, reliability, and maintainability).

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e. This option has received the least amount of support from the Park Service, study area communities and interested groups and individuals.

f. Although wasteload allocations for sub-surface discharges have been developed, a lesser degree of confidence is attached to these allocations than to surface water discharges.

g. This option would preclude the possibility of Park City or the Park Service being served by a regional system.

C. PREFERRED ALTERNATIVE

The underlying theme of the EIS is that the provision of wastewater services should be compatible with efforts to preserve and protect the Mammoth Cave Area's nationally significant cave systems and their unique physical, biological and historical resources. It is therefore incumbent upon EPA to explore all available mechanisms to achieve an environmentally sound alternative that is sensitive to economic realities. The selection of the least costly alternative is not EPA's only aim, but rather the selection of an environmentally protective alternative that is locally affordable. In this regard, a regional system is viewed as the environmentally preferred option. However, local economic constraints dictate that other environmentally acceptable options be pursued.

In light of the concerns regarding cost and the protection of the cave resources, the approach selected by EPA is a phased approach which, depending on local decisions, will ultimately result in a regional (Alternative 2) or semi-regional (Alternative 5) wastewater management system.

1. The initiation of Phase I of the project which would provide for design for upgrading the treatment facilities at Cave City (0.37 mgd) and Horse Cave (0.53 mgd) and for conveyance facilities to the Green River. The conveyance facilities would be evaluated with and without future flows from Park City, (0.08 mgd) the proposed Mammoth Cave National Park Staging Area (0.105 mgd), and the Route 70 area.

2. The establishment of a critical decision date to coincide with completion of the preliminary design for Horse Cave and Cave City for the NPS's decision regarding the development of the proposed Staging Area or the local communities' commitment to obtain additional non-EPA funding sources.

3. The initiation of Phase II of the project which would provide for final design for facilities based on the above decisions. At that point, EPA and the Commonwealth of Kentucky will also have to define the extent

of EPA eligibility for remaining design and construction.

- If the NPS does develop the Staging Area and is able to provide significant funding assistance for Park City or additional non-EPA funds are available, the remaining components of the regional alternative could be constructed. These construction elements would involve treatment facilities at Park City and the Mammoth Cave National Park Staging Area, conveyance facilities from Park City to the Staging Area along Route 70 to Cave City and expand Cave City's facility to 0.58 mgd. This would, in essence, be Alternative 2.

- If the NPS does not develop the proposed Staging Area or additional non-EPA funds are not available, the remaining components of a semi-regional alternative would be constructed. This construction element would involve on-lot systems for Park City's residential areas and a community sub-surface absorption field for the Park City business district. Presently available funding mechanisms would allow for EPA participation in the cost of these activities but would be contingent on congressional continuation of these mechanisms. Also, funding would have to be in accordance with the State priority list. This would, in essence, be Alternative 5.

The regional alternative is most responsive to local and the NPS desires regarding protection of the groundwater and the cave systems. However, because of high cost and the resultant financial burden to be seen locally, the regional alternative may not be viable at this time. Local funding decisions to be made in the near future are critical to the ultimate wastewater management system for this area. Additional non-EPA funds must be available for a regional system to be affordable to Park City. Until the appropriate decisions related to NPS funding or other non-EPA financial assistance are made, EPA is moving to resolve existing wastewater management and water quality problems. In essence, the proposed phase approach allows for resolving the current more serious problems while remaining flexible to future local funding decisions. Figure S-1 presents the preferred approach to wastewater management in the Mammoth Cave study area, as recommended in this EIS.

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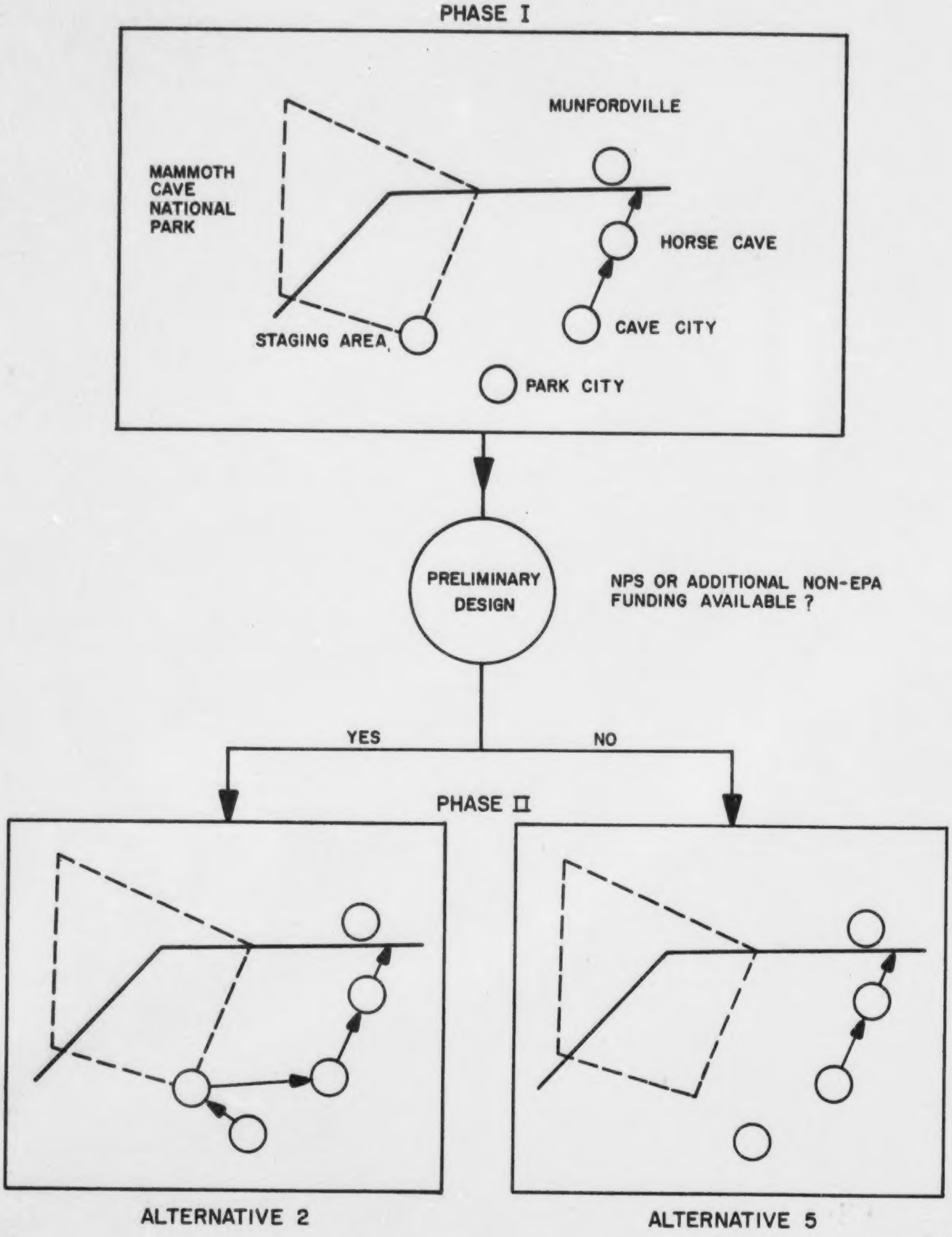
FIGURE S-1
MAMMOTH CAVE AREA
PREFERRED STRATEGY FOR WASTEWATER MANAGEMENT


PHASE I
MUNFORDVILLE
MAMMOTH CAVE NATIONAL PARK
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
PRELIMINARY DESIGN
NPS OR ADDITIONAL NON-EPA FUNDING AVAILABLE ?
YES
NO
PHASE II
ALTERNATIVE 2
ALTERNATIVE 5

D. DRAFT EIS COMMENTS

Comments on the Draft Statement were received from the following:

Federal Agencies

U.S. Army Corps of Engineers

Department of Health and
  Human Services
  Environmental Health
  Services Division

U.S. Department of the Interior
  - Office of the Secretary
  - National Park Service
  - Fish and Wildlife Service

State Government

Kentucky Department for Natural Resources and
  Environmental Protection
  - Division of Water
  - Office of the Secretary
Kentucky Heritage Commission
Ohio River Basin Commission
Kentucky Department of Fish and Wildlife Resources
Office of State Archaeology
Kentucky Department of Transportation

Local Government

Cave City Council (Leo E. Esters)

Interested Groups

Sierra Club

15<

Individuals

Jack L. Abney, Environmental Planner
Tom Chaney
Campbell Wallace
Tom Aley

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I. INTRODUCTION

This Final Environmental Impact Statement (FEIS) for the Mammoth Cave Area Wastewater Facilities, Mammoth Cave, Kentucky supplements the Draft EIS issued in April 1981. The EIS has been prepared in accordance with the Council on Environmental Quality (CEQ) Guidelines and EPA Guidelines for the preparation of Environmental Impact Statements. This EIS is also in response to the requirements of Public Law 91-190, the National Environmental Policy Act of 1969, which requires the preparation of an EIS for any major Federal action that will significantly affect the quality of the environment. While this summary document is intended to be comprehensive, the supporting information furnished with the Draft EIS should be reviewed and is incorporated here by reference. It is to be noted that this Final EIS supercedes the Draft EIS wherever conflicts between the two exist.

The Final EIS contains eight major sections. Section II, EPA Decision, describes in detail the preferred alternative and the evaluation process that led to the selection of this alternative. Section III presents a summary of the Draft EIS, including a review of each Chapter in the Draft EIS and major findings and recommendations. Section IV presents any revisions and additional information gathered after issuance of the Draft EIS in April 1981. EPA's responses to comments received on the Draft EIS are tabulated is Section V. The written comments, and the oral comments received at the Public Hearing are indexed in this section. Section VI contains the transcript of the Draft EIS Public Hearing held on June 8, 1981. Additional comments received on the Draft EIS are presented in Section VII. A list of EIS preparers is presented in Section VIII.

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II. EPA DECISION

A. DESCRIPTION OF THE PROPOSED ACTION

The underlying theme of the EIS is that the provision of wastewater services should be compatible with efforts to preserve and protect the Mammoth Cave Area's nationally significant cave systems and their unique physical, biological and historical resources. It is therefore incumbent upon EPA to explore all available mechanisms to achieve an environmentally sound alternative that is sensitive to economic realities. The selection of the least costly alternative is not EPA's only aim, but rather the selection of an environmentally protective alternative that is locally affordable. In this regard, a regional system is viewed as the environmentally preferred option. However, local economic constraints dictate that other environmentally acceptable options be pursued.

In light of the concerns regarding cost and the protection of the cave resources, the approach selected by EPA is a phased approach which, depending on local decisions, will ultimately result in a regional (Alternative 2) or semi-regional (Alternative 5) wastewater management system.

This approach would involve the following components:

1. Initiate Phase I of the project which would provide for design for upgrading the treatment facilities at Cave City (0.37 mgd) and Horse Cave (0.53 mgd) and for conveyance facilities to the Green River. The conveyance facilities would be evaluated with and without future flows from Park City (0.08 mgd), the proposed Mammoth Cave National Park Staging Area (0.105 mgd), and the Route 70 area.

2. The establishment of a critical decision date to coincide with completion of the preliminary design for Horse Cave and Cave City for the NPS's decision regarding the development of the proposed Staging Area or the local communities' commitment to obtain additional non-EPA funding sources.

3. Initiate Phase II of the project which would provide for final design for facilities based on the above decisions. At that point, EPA and the Commonwealth of Kentucky will also have to define the extent of EPA eligibility for remaining design and construction.

   - If the NPS does develop the Staging Area and is able to provide significant funding assistance for Park City or additional non-EPA funds are available, the remaining components of the regional alternative could be constructed. These construction elements would involve treatment facilities at Park City and the Mammoth Cave National Park *Staging Area, conveyance facilities* from Park City to the Staging Area along Route 70 to Cave City and expand Cave City's facility to 0.58 mgd. This would, in essence, be Alternative 2.

- If the NPS does not develop the proposed Staging Area or additional non-EPA funds are not available, the remaining components of a semi-regional alternative would be constructed. This construction element would involve on-lot systems for Park City's residential areas and a community sub-surface absorption field for the Park City business district. Presently available funding mechanisms would allow for EPA participation in the cost of these activities but would be contingent on Congressional continuation of these mechanisms. Also, funding would have to be in accordance with the State Priority list. This would, in essence, be Alternative 5.

The regional alternative is most responsive to local and NPS desires regarding protection of the groundwater and the cave systems. However, because of the high cost and the resultant financial burden to be seen locally, the regional alternative may not be viable at this time. Local funding decisions to be made in the near future are critical to the ultimate wastewater management systems for this area. Additional non-EPA funds must be available for a regional system to be affordable to Park City. Until the appropriate decisions related to NPS funding or other non-EPA financial assistance are made, EPA is moving to resolve existing wastewater management and water quality problems. In essence, the proposed phased approach allows for resolving the current more serious problems while remaining flexible to future local funding decisions. Figure S-1 in the Executive Summary describes the proposed strategy for wastewater management in the study area.

Effluent Limits

Under the preferred action, all treated wastewater from Horse Cave and Cave City would be conveyed to the Green River for disposal. Because of the large 7 day, 10 year low flow, approximately 160 cfs, effluent limitations for the Green River are secondary treatment levels. This would mean a discharge of 30 mg/l of suspended solids and 30 mg/l of BOD_5.

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Description of Proposed Facilities

Horse Cave : The Horse Cave wastewater treatment facility is a high-rate trickling filter plant designed for a hydraulic loading of 0.4 mgd and a BOD_5 loading of approximately 870 lbs/day. Major wastewater treatment processes include grit removal, comminution, primary sedimentation, trickling filtration, secondary sedimentation and chlorination. According to the 201 Wastewater Facilities Plan the Horse Cave plant is capable of producing an effluent BOD_5 of approximately 50 mg/l if operated at optimum efficiency. (This is contingent on adequate pre-treatment of industrial wastewater.)

Since the existing facility is capable of providing substantial BOD_5 removal, it appears that a second stage biological treatment step in series with existing trickling filter process is the most appropriate method of treatment for upgrading plant effluent. Therefore it is recommended that an activated sludge second stage biological treatment step be added to the process train. In addition, a new secondary clarifier is also recommended. A flow equalization basin is also recommended to handle industrial flow eminating from Ken Dec.

Cave City: The Cave City treatment plant provides biological wastewater treatment by means of a high-rate trickling filter with a design capacity of 0.37 mgd. The Cave City treatment plant would also be upgraded to provide secondary level treatment through the addition of activated sludge and a new secondary clarifier to the existing process. Should the National Park Service develop the Staging Area, then the regional system option (Alternative 2) would involve construction of treatment facilities at Park City and the Staging Area, conveyance facilities from Park City to the Staging Area along Route 70 to Cave City and expansion of Cave City's facility to 0.58 mgd.

Park City: Under this preferred alternative, Park City would have two options. If the National Park Service develops the Staging Area and provides funding assistance or, if additional non-EPA funding assistance is available then a centralized collection and treatment system would be constructed at Park City. However, if there is no participation, then Park City could utilize the option of a community low pressure sewer system for collection and a community soil absorption field for the downtown area. Outlying areas would utilize on-lot systems.

Munfordville: This facility would continue to serve the existing service area. Homes and businesses outside the existing service area would be served by on-lot systems (septic tanks).

Mammoth Cave National Park's Proposed Staging Area: Under the preferred alternative, the proposed Staging Area would have two options. If the Staging Area is part of the regional system option under Phase 2, then a wastewater treatment facility would be constructed to serve the Staging Area. Treated wastewater from Park City would be pumped to the Staging Area, mixed with the Staging Area wastewater and pumped ultimately to the Green River for surface water discharge. If the Staging Area is part of the semi-regional system option under Phase 2, then composting waterless toilets - septic tank/soil absorption systems are recommended. It should be noted that facilities for the Park Service are not EPA grant eligible and these costs would be borne solely by the Park Service.

Route 70 area: Under the preferred alternative, the Route 70 area (between the Park and Cave City) would have two options. Under the regional system option of Phase 2, the area west of Toohey Ridge would be served by a gravity line with wastewater flowing to the Staging Area treatment plant. The area east of Toohey Ridge along Route 70 would be served by a gravity line with wastewater flowing to the Cave City treatment plant. Treated wastewater will ultimately be discharged to the Green River. Under the semi-regional system option of Phase 2, the Route 70 area would be served by on-lot systems - upgraded as necessary.

Conveyance Facilities: Under the preferred alternative several pumping stations and force mains would be constructed to convey wastewater. A pumping station would be built at the Cave City treatment plant to convey wastewater from Cave City to Horse Cave via a force main. Another pumping station would be constructed at the Horse Cave treatment plant to convey the combined flows of Cave City and Horse Cave to the Green River. This would be via a force main to the Green River where disposal would take place.

If the National Park Service participated in the preferred alternative, a pumping station would be constructed at Park City to convey wastewater via a force main to the NPS Staging area. From there, wastewater would be pumped via force main to the Cave City treatment plant. Figures II-1 and II-2 show the configurations involved with both the regional system option (#2) or the semi-regional option (#5) of the preferred approach.

B. PURPOSE OF AND NEED FOR ACTION

The Mammoth Cave Area EIS is being prepared to address the provision of wastewater management facilities for a portion of the Mammoth Cave National Park and four communities adjacent to the Park. The EIS study area is situated in the Central Kentucky karst which is characterized by a gently rolling terrain pitted with sinkholes. The subsurface contains a complex structure of limestone caves and free-flowing groundwaters. The area's geological features are recognized as unique national resources and provide the area with a strong tourist attraction at the National Park and other local commercial caves.

There are five major population centers in the study area. These include the municipalities of Munfordville, Horse Cave, Cave City, Park City and the proposed Staging Area at Mammoth Cave National Park. With the exception of Park City, these population centers maintain and operate wastewater treatment facilities. The disposal technique prac-

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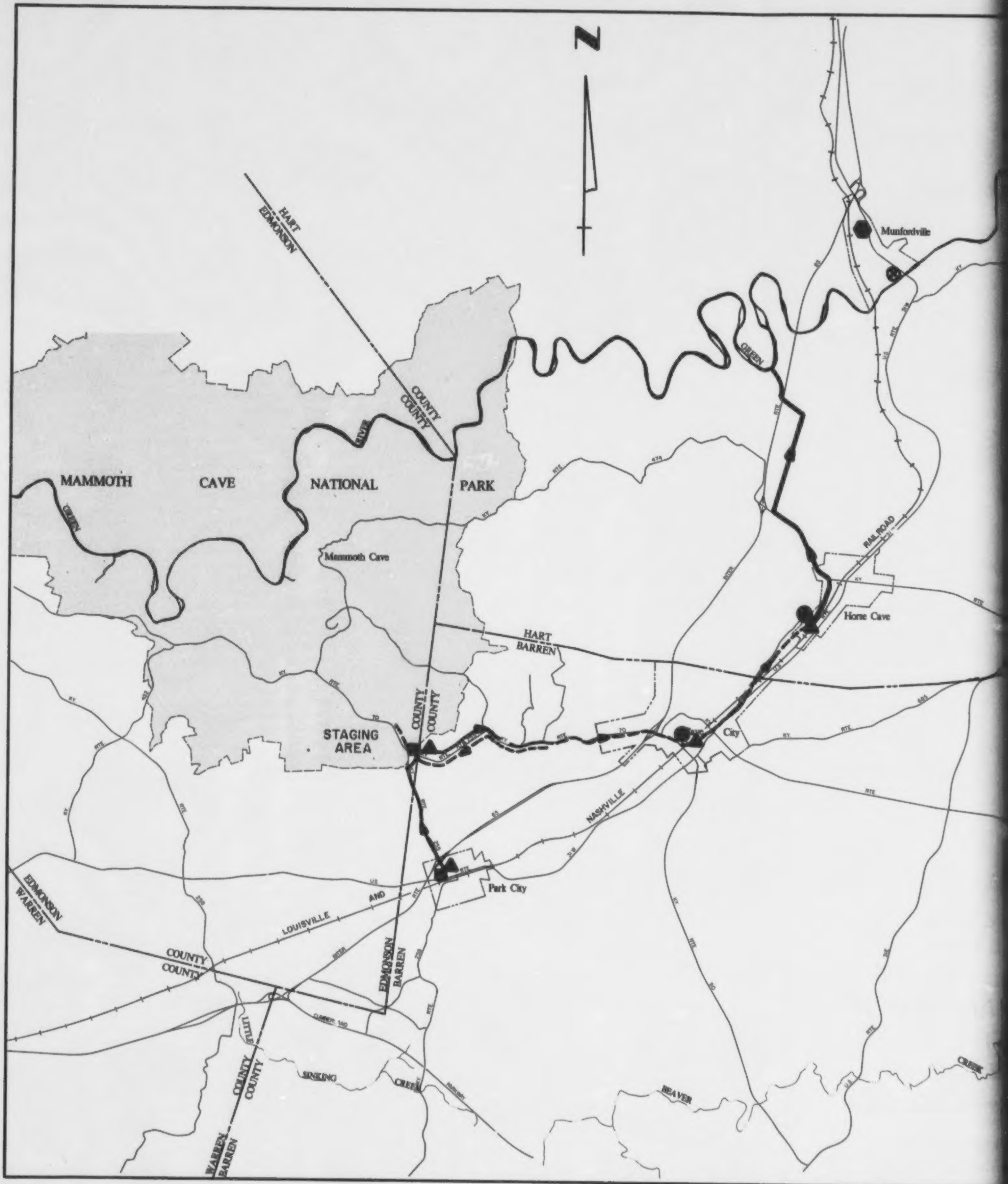

N
HART
EDMONSON
COUNTY
COUNTY
MAMMOTH CAVE NATIONAL PARK
GREEN
RIVER
Mammoth Cave
Munfordville
Horse Cave
City
Park City
STAGING AREA
HART
BARREN
EDMONSON
WARREN
EDMONSON
BARREN
WARREN
BARREN
LOUISVILLE
AND
NASHVILLE
RAIL ROAD
LITTLE
SINKING
CREEK
BEAVER
CREEK
RTE
KY
US
31W
65
70
474
255
90

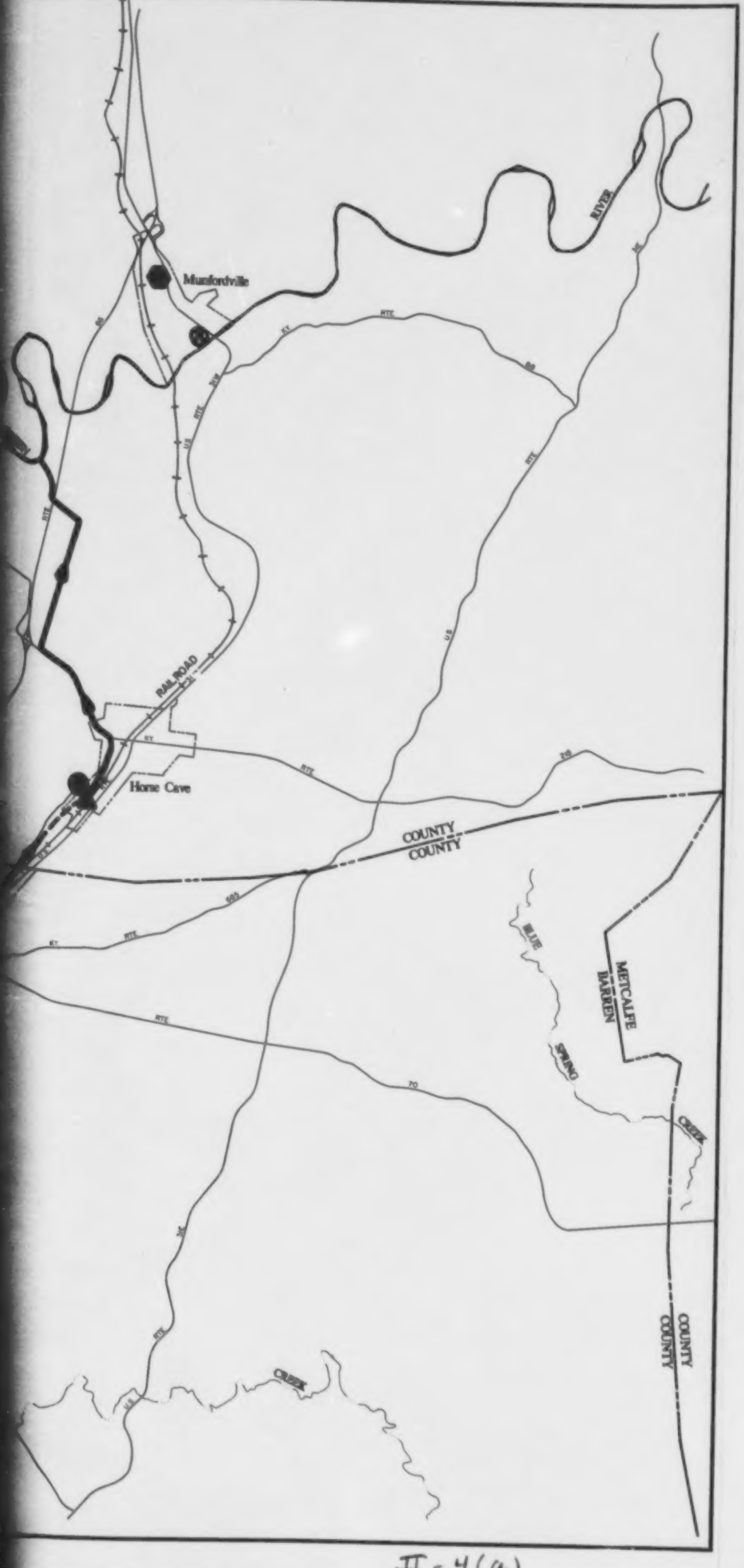

Munfordville
RIVER
RTE
KY
US
RAILROAD
Horse Cave
COUNTY
COUNTY
BLUE
SPRING
CREEK
METCALFE
BARREN
COUNTY
COUNTY
CREEK
LEGEND
MAMMOTH CAVE NATIONAL PARK
FORCE MAIN
GRAVITY INTERCEPTOR
EXISTING TREATMENT FACILITY
UPGRADED EXISTING FACILITY
NEW WASTEWATER TREATMENT FACILIT
PUMPING STATION
ON-LOT SYSTEMS
LAND APPLICATION SITE

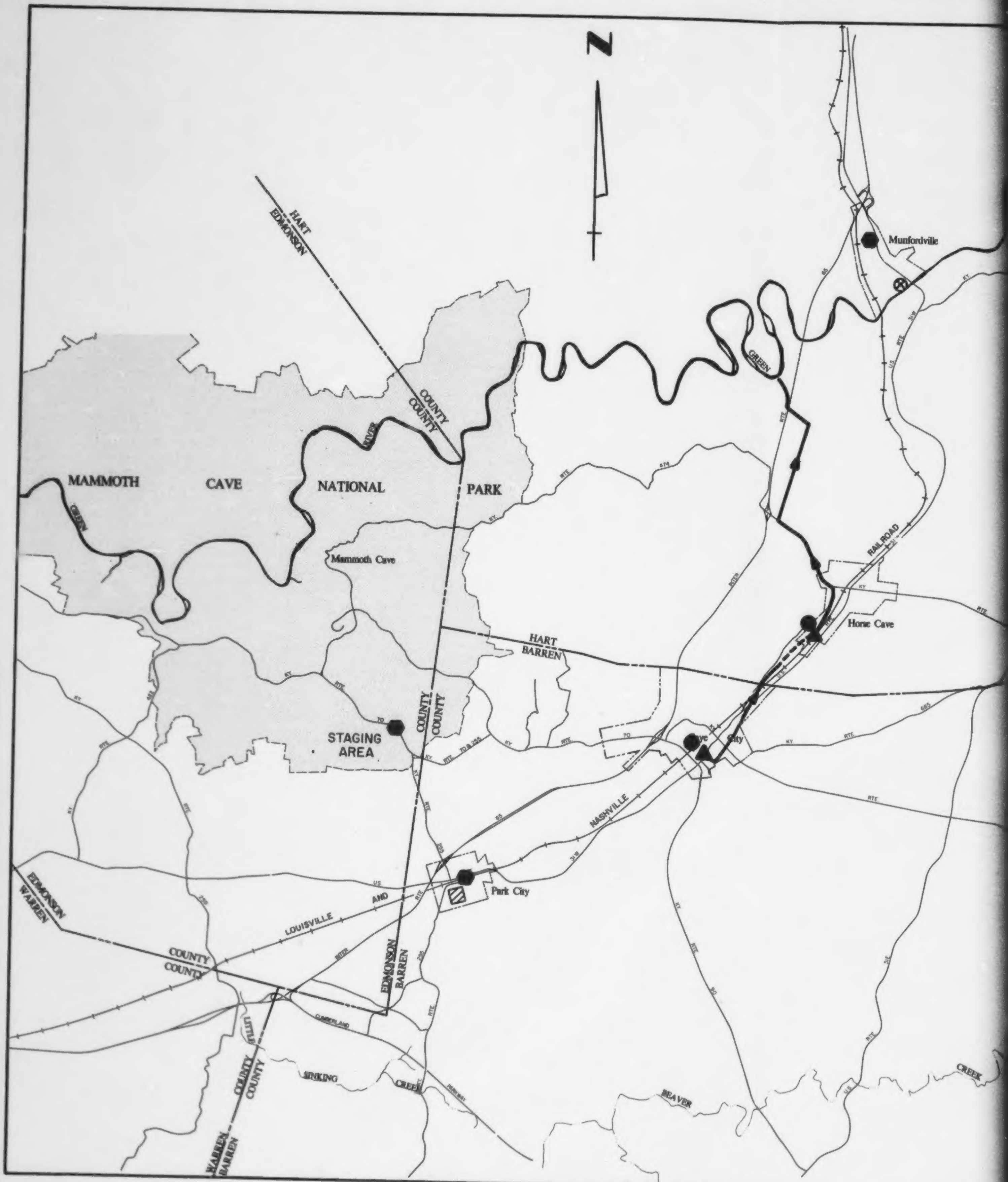
FIGURE II-1

MAMMOTH CAVE AREA
201 FACILITIES PLAN

ENVIRONMENTAL IMPACT STATEMENT
WASTEWATER MANAGEMENT
ALTERNATIVE 2
(PC-SA-CC-HC)2 PLUS MN-1

12,000 6000 0 12,000 24,000
Scale In Feet

U.S. Environmental Protection Agency
Region IV Atlanta, Georgia


N
HART
EDMONSON
COUNTY
COUNTY
MAMMOTH
CAVE
NATIONAL
PARK
GREEN
RIVER
GREEN
Mammoth Cave
HART
BARREN
STAGING
AREA
COUNTY
COUNTY
Munfordville
Horse Cave
Cave City
Park City
RAILROAD
NASHVILLE
LOUISVILLE
AND
EDMONSON
WARREN
COUNTY
COUNTY
EDMONSON
BARREN
LITTLE
CUMBERLAND
SINKING
CREEK
BEAVER
CREEK
WARREN
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685
90
31E
KY
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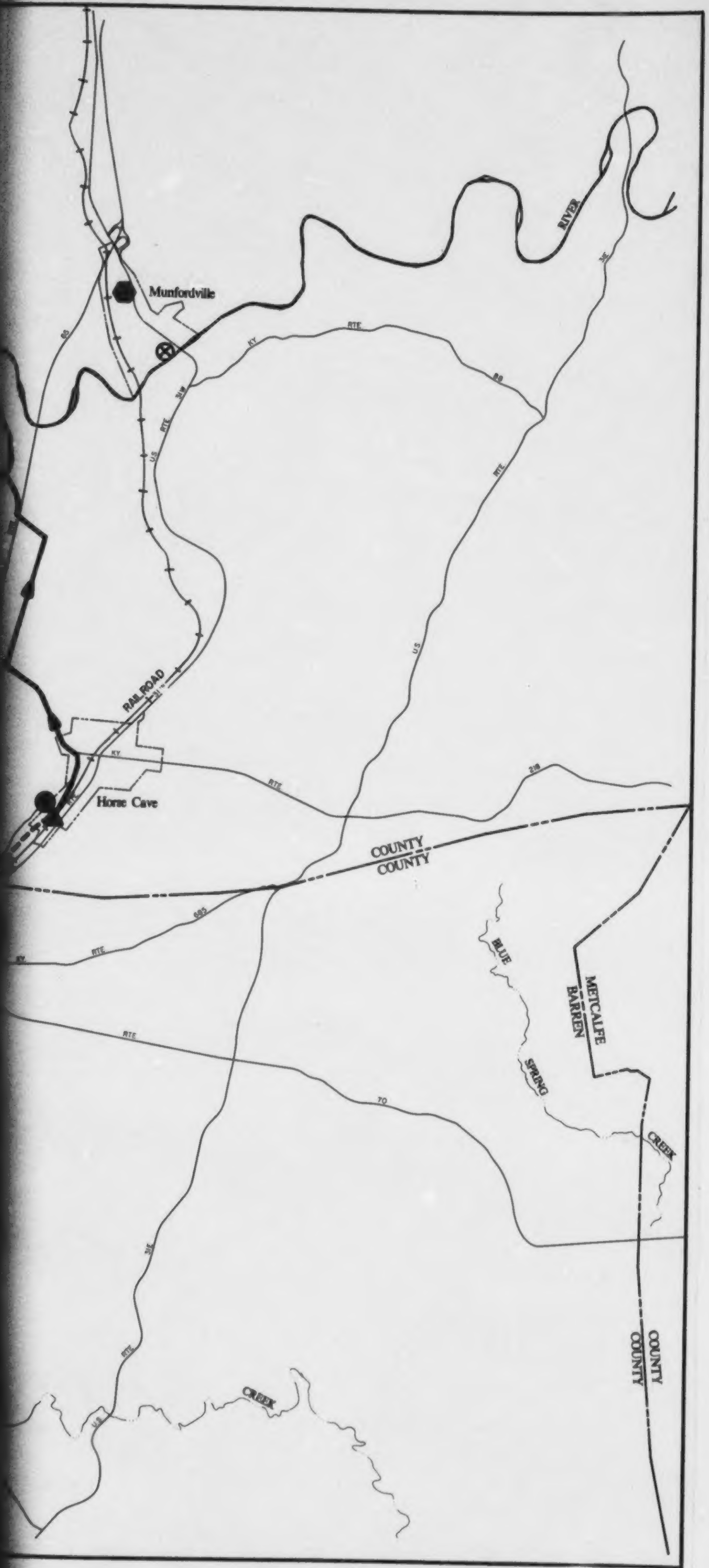
Munfordville
RIVER
KY
RTE
88
31W
US
RTE
31E
RAILROAD
Horse Cave
KY
RTE
218
COUNTY
COUNTY
685
RTE
KY
RTE
70
BLUE
SPRING
CREEK
METCALFE
BARREN
COUNTY
COUNTY
CREEK
RTE
US

LEGEND

▨	MAMMOTH CAVE NATIONAL PARK
──	FORCE MAIN
----	GRAVITY INTERCEPTOR
⊗	EXISTING TREATMENT FACILITY
●	UPGRADED EXISTING FACILITY
▲	PUMPING STATION
⬢	ON-LOT SYSTEMS
▨	LAND APPLICATION SITE

FIGURE II-2

MAMMOTH CAVE AREA
201 FACILITIES PLAN

ENVIRONMENTAL IMPACT STATEMENT

WASTEWATER MANAGEMENT ALTERNATIVE 5

SA PLUS PC-2 PLUS (CC-HC)8 PLUS MN-1

12,000 6000 0 12,000 24,000
Scale In Feet

U.S. Environmental Protection Agency
Region IV Atlanta, Georgia

ticed by Munfordville and Mammoth Cave National Park is surface water discharge to the Green River. Treated effluent is disposed of in Horse Cave and Cave City, however, by direct discharge to adjacent sinkholes. This practice has the potential to adversely impact the unique underground cave systems of the study area, primarily because of the quality of the effluent discharged. Recent sampling data indicates unsatisfactory performance at the Horse Cave plant principally due to industrial wastewaters discharged to the plant. Slightly over 50 percent of the daily average flow is untreated industrial wastewater from the Hart County Creamery and Ken Dec's electroplating plant, resulting in influent high in BOD and heavy metals concentrations. Also, the Cave City plant is not providing the level of treatment required by its NPDES permit, according to plant performance data.

Already plagued with severe subsurface water pollution problems is the Hidden River Cave complex situated in downtown Horse Cave. Once a tourist attraction and a water supply source, the Hidden River is now the recipient of inadequately treated wastewater discharges from the Horse Cave and Cave City treatment plants. This has resulted in severe odor problems and the degradation of the entire Hidden River Cave environment.

Problems in the area are further compounded by the proliferation of tourist related facilities, especially those along Kentucky Route 70, which is a major entrance to the Park. Many of these facilities rely upon on-lot disposal systems. Additionally, Park City is served primarily by on-lot systems with approximately 80% of the residences and businesses discharging untreated wastewater directly to the subsurface. The remaining 20% have septic tanks which result in a direct discharge to the subsurface streams.

The major concern with the tourist facilities along Kentucky Route 70 and Park City is that they are in sub-surface drainage basins which flow into Mammoth Cave National Park and wastewater from improperly installed, operated, and maintained on-lot systems may affect subsurface water quality in and around the Park. Furthermore, the boundaries of the sub-basins are not fixed. They move in unknown ways depending on groundwater levels in the aquifer and on the flood stage of the surface rivers. This is caused by the filling of normally dry cave passages which may spill over into adjacent basins. This effect is particularly important with respect to Echo River Springs which is located in Mammoth Cave National Park. Under low flow conditions Echo River Spring derives its water almost entirely from the region of Mammoth Cave Ridge and much of its catchment is within the National Park. Under high flow conditions, a spillover occurs at an unknown point and water from the Park City-Cave City area of the Sinkhole Plain flows under the ridges to greatly augment the flow of Echo River spring. This implies that pollutants introduced in the more highly populated part of the Central Kentucky Karst could be carried into the National Park, affecting aquatic life in the low level passages and even reaching portions of the cave close to those used by visitors.

C. COST EVALUATION SUMMARY

A detailed evaluation of all significant cost components of the alternative wastewater management systems is required in order to perform the comparative cost analysis. Construction, project, and operation and maintenance costs are developed for each management system for incorporation into a net present worth cost analysis. The present worth cost analysis establishes a basis for comparison of total costs (capital and annual operations costs) for each of the wastewater management alternatives. These total costs include the federal share of the costs associated with construction grants. Comparative cost analysis (either present worth or equivalent annual cost) is an EPA requirement in performing the cost effectiveness analysis and serves as the primary cost evaluation criterion according to EPA guidelines.

Cost Development

Construction, project and operation and maintenance costs are developed for all wastewater facilities in each management system.* Available local cost, data from recent similar projects, standard costing sources and detailed engineering estimates are used in cost development. All costs are trended to mid-1979 price levels projected for the Mammoth Cave area.

Present Worth Analysis

As previously noted, the alternative wastewater management systems have been compared on the basis of their relative net present worth in accordance with EPA regulations. The present worth analysis establishes an estimated total cost value of the capital expenditures (project costs) and operating cost of each alternative over the duration of the planning period. For the purposes of this net present worth evaluation, construction of the wastewater facilities in the wastewater management alternatives is assumed to take place in 1983 resulting in a 17-year planning period ending with the year 2000. The discount rate use in the net present worth analysis is 7.125 percent. In accordance with EPA guidelines, allowances are made for salvage value at the end of the planning period. Also, phasing of construction is included in the analysis where applicable.

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*Cost estimates for wastewater management are developed readily from detailed estimates prepared for the cost evaluation of local and joint wastewater treatment/disposal options. Since each of the wastewater management alternatives is composed of two or more recommended options, the estimated cost for any management alternative is the sum of the costs of wastewater facilities (collection, conveyance, treatment and disposal) associated with the recommended treatment/disposal options incorporated into that management alternative.

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The present worth analysis of the preferred strategy (showing both future options available to Park City and the proposed Staging Area) is shown in Table II-1. The present worth costs of the eight EIS Alternatives are presented in Table III-1 in Section III.B. of this document.

D. ENVIRONMENTAL EVALUATION SUMMARY

An evaluation was conducted to assess and compare the impacts of alternative wastewater management plans on the natural and man-made environment. A parameter-checklist evaluation methodology was used to analyze the impacts for the eight wastewater management alternatives. This methodology presented a specific list of environmental parameters to be investigated for possible impacts but did not require the establishment of direct cause-effect links to project activities.

A scaling-weighting checklist was used in this project for the evaluation of potential impacts to the environment. Scaling factors were used to estimate the relative magnitude of impacts while weighting factors were assigned to each environmental parameter and were constant for all alternatives. Scaling factors varied according to the magnitude of the impact for each alternative.

The impact scaling factors could be beneficial (+) or adverse (-). The score for an environmental parameter wastewater management alternative combination is the product of the weight and the scale. The summation of the parameter alternative scores for an individual alternative yields a cumulative comparative score for that alternative.

The natural environment evaluation for the preferred strategy indicates that Alternative 5 received the highest rating and Alternative 2 was tied for fourth. Both 5 and 2 were shown to positively impact odor, subsurface water quality, surface water quantity, cave ecology and rare and endangered species; while negatively impacting air quality, topography, geology, noise, surface water quality and surface ecosystems.

The man-made environment evaluation for the preferred strategy indicates that Alternative 2 was given the highest rating and Alternative 5 was rated second. Both 2 and 5 were shown to positively impact population, land use, economic conditions, historical/cultural/archaeological resources, recreational resources, wastewater programs, water supply and community services; while negatively impacting transportation facilities. The overall environmental evaluation resulted in Alternative 5 achieving the highest rating, while Alternative 2 tied for the second highest rating.

The environmental impacts of the preferred alternative are discussed in more detail in Section III.E.

TABLE II-1

PREFERRED ALTERNATIVE COST SUMMARY

Present Worth Analysis

Wastewater Management Alternative	1981 Project Cost	Annual O&M Costs	Present Worth Annual O&M Costs	Total Present Worth	Year 2000 Salvage Value	Present Worth Salvage Value	Net Present Worth
Alternative 2 (PC-SA-CC-HC)[2] plus MN-1	10,574,000	261,000	2,527,000	13,101,000	4,770,000	1,481,000	11,620,000
Alternative 5 SA plus PC-2 plus (CC-HC)[8] plus MN-1	6,546,000	230,000	2,226,000	8,772,000	2,568,000	797,000	7,975,000

Estimated Local Annual Costs

Wastewater Management Alternative	Construction Costs	Project Costs	Assumed Grant Eligible Project Costs	Anticipated Grants	Local Share Project Costs	Annual Debt Service	Annual O&M Costs	Local Annual Costs
Alternative 2 (PC-SA-CC-HC)[2] plus MN-1	8,333,000	10,574,000	8,615,000	6,518,000	2,756,000	417,000	261,000	678,000
Alternative 5 SA plus PC-2 plus (CC-HC)[8] plus MN-1	5,110,000	6,546,000	5,769,000	4,502,000	1,758,000	210,000	226,000	436,000

TABLE II-1 (Cont'd.)

Estimated Annual User Costs[1]

Wastewater Management Alternative	Park City				Cave City			
	1981 Project Costs	Annual O&M Costs	Total Annual Local Costs (with grant)	Annual User Costs[2]	1981 Project Costs	Annual O&M Costs	Total Annual Local Costs (with grant)	Annual User Costs
Alternative 2 (PC-SA-CC-HC)[2] plus MN-1	3,652,000	40,000	149,000	$425-495	1,835,000	68,000	123,000	$68
Alternative 5 SA plus PC-2 plus (CC-HC)[8] plus MN-1	1,249,000	26,000	50,000	$145-165	2,340,000	73,000	143,000	$79

Wastewater Management Alternative	Horse Cave				Munfordville			
	1981 Project Costs	Annual O&M Costs	Total Annual Local Costs (with grant)	Annual User Costs	1981 Project Costs	Annual O&M Costs	Total Annual Local Costs (with grant)	Annual User Costs
Alternative 2 (PC-SA-CC-HC)[2] plus MN-1	1,752,000	87,000	139,000	$39	570,000	26,000	56,000	*
Alternative 5 SA plus PC-2 plus (CC-HC)[8] plus MN-1	1,895,000	88,000	145,000	$40	776,000	26,000	56,000	*

TABLE II-1 (Cont'd.)

Estimated Annual User Costs[1] (Cont'd.)

	Staging Area				Route 70			
Wastewater Management Alternative	1981 Project Costs	Annual O&M Costs	Total Annual Local Costs (with grant)	Annual User Costs	1981 Project Costs	Annual O&M Costs	Total Annual Local Costs (with grant)	Annual User Costs
Alternative 2 (PC-SA-CC-HC)[2] plus MN-1	1,297,000	28,000	162,000	**	1,259,000	12,000	50,000	***
Alternative 5 SA plus PC-2 plus (CC-HC)[8] plus MN-1	285,000	13,000	42,000	**	-	-	-	-

NOTES: [1] Estimated annual user costs do not include existing user charges for Cave City and Horse Cave.

[2] Assumes 75% funding for conventional collection systems. However, conventional collection systems are generally not funded. If low pressure systems are 85% funded, user charges are increased by approximately 5%.

*No user charge estimation due to lack of water service records, combined wastewater service facilities (community on-lot and conventional) in the Munfordville area (refer to Alternative MN-1), and the uncertainty of the number of customers to be connected during the planning period.

**Same as local annual cost since the Park Service would be the only customer at the Staging Area.

***No user charge estimation due to the uncertainty of the number of connections to be on line, and lack of water service records.

E. IMPLEMENTABILITY SUMMARY

The practicalities of implementing a specific wastewater management plan must be considered, together with cost, environmental impact and operability evaluations, as an important part of the cost-effectiveness analysis. The purpose of the implementability rating is to assess the prospects for successful implementation of an alternative based on its potential for general public acceptance and political realities in the study area.

Unlike the other evaluation in the cost-effectiveness analysis (costs, environmental impacts & operability), the implementability rating is not independent, but is somewhat dependent on the results of the other evaluations. This is especially the case with public acceptance since costs and environmental impacts evaluations probably have the greatest influence on public acceptability. For example, if an environmentally favorable plan is significantly more costly, the public must decide how much it is willing to pay (in terms of monetary costs) for environmental benefits.

An important factor in public acceptance is the local annual cost associated with a wastewater management alternative. The local annual cost includes annual operation and maintenance costs plus the annualized local share of the cost of constructing the wastewater facilities. This is a measure of annual revenue requirements, and therefore, the actual cost to the users. Since construction costs are 75 percent federally funded and local operation and maintenance costs are not subsidized, projects with high construction and low operation and maintenance costs sometimes have lower local annual costs even though they are higher on a net present worth basis than other plans with greater operation and maintenance costs and lower construction costs.

Local annual costs including estimated annual user costs for the preferred alternative are listed in Table II-1.

Through the series of Citizen Review Committee meetings held in the study area it has become clear that environmental protection of the local natural resources such as the complex cave systems and subsurface streams are of paramount concern. There is considerable sentiment from the local community, the National Park Service and cave research and exploration groups that the area must be protected from further intrusions of wastewater. This clearly means utilizing a regional alternative to remove all wastewater from the area.

This solution is more expensive since it means conveying all treated wastewater to the Green River. However, based upon local reaction and input, cost considerations do not appear to be an important barrier. The only exception is Park City where sewer rental rates would clearly be beyond the ability of many local residents to pay based upon cost estimates.

The local communities and the National Park Service are aware that the natural resources of the area need protection. Furthermore their protection is important to the area since most of the area's

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economy is dependent upon the continuing viability of cave resources as a source of tourism.

Another aspect of implementability is the ownership and operation of the new wastewater facilities. Several options are being considered by the local communities. However, it appears that a local service authority will be formed by the communities of Horse Cave and Cave City. This authority would have responsibility for ownership and operation of the new conveyance facilities recommended in the preferred alternative. They would generate revenues from rentals charged to Horse Cave and Cave City for the use of the conveyance systems.

F. EIS REQUIREMENTS

The following EIS Requirements are included to mitigate adverse or potential adverse affects of the preferred alternative. These requirements will be incorporated into the project as special Grant 2 conditions.

1. Flow Monitoring Instrumentation

The potential exists for sewer line leaks or breaks to adversely impact the area's subsurface water and cave resources. To ensure expeditious identification and correction of leaks or breaks and to monitor the flow between population centers, flow monitoring instrumention will be required at reasonable intervals along the inter-city conveyance line. The type of instrumentation and the interval between instrumentation placement should be decided during Step 2.

2. Endangered Species

The Fish and Wildlife Service has noted that 3 endangered mussels and their habitats are known in the Green River and could potentially be affected by the construction and/or operation of the proposed Green River discharge. In order to satisfy the requirements of the Endangered Species Act and the concerns of the Fish and Wildlife Service, the appropriate measures must be taken early during Step 2 preliminary design to identify areas of concern regarding these 3 protected mussel species. Additionally, measures to avoid or mitigate identified adverse impacts must be developed during this stage of preliminary design. If necessary, Section 7 consultation involving the Fish and Wildlife Service, EPA and the applicant will be undertaken.

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3. Archaeological and Geological Surveys

Since the exact routings of interceptor lines are not known at this time, detailed surveys could not be performed. Surveys of the interceptor corridors will be performed during Step 2 design. These surveys will be reviewed by EPA prior to granting funds for construction.

There is a potential that archaeological resources are present in or near proposed interceptor corridors. No construction will take place until surveys are completed to the satisfaction of the State Archaeologist and the State Historic Preservation Officer. Should resources be discovered, the appropriate state office should be contacted for appropriate preservation, avoidance or other mitigative measures. No construction will take place until the appropriate state offices have been satisfied with the selected mitigative measures.

The study area is located in the Central Kentucky Karst region and as such the area's geology may contain formations that pose a hazard to conventional interceptor design and construction. Prior to initiation of final design, proposed interceptor corridors shall be surveyed to determine the existence of subsurface formations and, if necessary, appropriate measures (design modifications or interceptor rerouting) shall be taken.

Section III.F of this document provides additional information on other available mitigative measures that could be applied during design and construction of the preferred alternative.

III. DRAFT EIS SUMMARY

A. BACKGROUND OF THE STUDY

The Mammoth Cave Area Environmental Impact Statement has been prepared in response to the legal requirements of the National Environmental Policy Act of 1969, P.L. 91-900. This Act requires the preparation of an EIS for any major Federal action that will significantly affect the quality of the human environment. This EIS was prepared by the U.S. Environmental Protection Agency, Region IV and addresses the issues and concerns for potential environmental impacts resulting from a major federal action in the Mammoth Cave area of Kentucky.

The major Federal action regarding wastewater facilities for the Mammoth Cave area is represented by the Section 201 Facilities Plan for the same area. This plan was prepared in response to P.L. 92-500, the Federal Water Pollution Control Act Amendment. Under this Act, a 201 Facilities Plan is required as the first step toward the design and construction of wastewater facilities. In the Mammoth Cave study, the 201 Facilities Plan was prepared in conjunction with the EIS, due to the environmental complexities in the cave area and the financial and management constraints of the applicant cities.

In 1977, EPA granted Step I funding for preparation of the Mammoth Cave Area 201 Facilities Plan. The project area developed by the Kentucky Division of Water Quality includes the cities of Munfordville and Horse Cave in Hart County, and Cave City and Park City in Barren County. In addition, consideration was given to the Mammoth Cave National Park. These cities are represented by the Barren River Area Development District (BRADD) in Bowling Green, Kentucky. BRADD, a regional planning and development agency, has been coordinating the 201 Facilities Plan for the study area. In 1977, BRADD hired Campbell Wallace Consulting Engineers of Knoxville, Tennessee to prepare the 201 Facilities Plan.

The EIS was initiated in September, 1977. The focus of the study was on the development and evaluation of alternative wastewater management systems in the cave area and to ensure the integration of environmental and economic considerations at the earliest stage of facilities planning. Subsequently, a Notice of Intent was issued by the EPA Regional Administrator on October 5, 1977.

B. ALTERNATIVES DEVELOPMENT AND EVALUATION

The process of developing alternative wastewater management schemes for the Mammoth Cave area involved a presentation of a range of structural engineering alternatives and nonstructural considerations for the solution of wastewater management problems.

The first of two phases in the development of alternatives was the development of alternative wastewater service configurations. A service configuration is a distinct plan for providing wastewater treatment and disposal services to each major population center in the study area, either by local treatment/disposal, or joint treatment/disposal by two or more population centers.

The second phase of alternatives development involves screening various wastewater treatment/disposal techniques for applicability in the Mammoth Cave study area and generating treatment/disposal options for local treatment disposal at each population center as well as for each joint treatment combination which appears in the service configuration alternative.

Following completion of the phased approach to alternatives development, eight wastewater management alternatives were developed. The following is a description of the major components of each alternative.

Alternative 1: Wastewater collection system and extended aeration treatment facility at Park City; construction of a gravity sewer from the proposed Staging Area to the Park City treatment plant and conveyance facilities to transport treated wastewater from Park City to Cave City; conveyance facilities to transport treated wastewater from Cave City to Horse Cave; upgraded existing Cave City and Horse Cave treatment facilities; additional on-lot treatment systems at Munfordville; and pump station and force main to convey commonly treated wastewater to the Green River discharge point.

Alternative 2: Wastewater collection system and extended aeration facility at Park City; construction of a pump station and force main to convey treated wastewater from Park City to the proposed Staging Area's pump station; gravity line to convey raw wastewater from the proposed Staging Area to the treatment plant site; gravity interceptor to convey raw wastewater from Rt. 70 development to the proposed Staging Area's plant site; extended aeration wastewater facility for Staging Area and Rt. 70 wastewater; pump station and force main at proposed Staging Area to convey combined treated wastewaters to gravity interceptor for gravity flow to Cave City along Rt. 70; gravity interceptor to convey treated wastewater and additional raw wastewater to Cave City; conveyance facilities to transport treated wastewaters to Horse Cave pumping station; upgraded existing Cave City and Horse Cave treatment facility; additional on-lot treatment systems at Munfordville; and pump station and force main to convey treated wastewaters to the Green River discharge point.

Alternative 3: Wastewater collection system and extended aeration wastewater treatment facility at Park City; conveyance facilities to transport treated wastewater from Park City to Cave City; upgraded existing Cave City treatment plant; composting waterless toilets - septic tank/soil absorption system for greywater at the proposed Staging Area.

Alternative 4: Same as Alternative 2, except that conventional and alternative on-lot treatment systems would be used at Park City, in addition to development of a small community low pressure sewer system

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and community soil absorption field.

Alternative 5: Composting waterless toilets - septic tank/soil absorption system for greywater at the proposed Staging Area; conventional and alternative on-lot systems, and small community low pressure sewer system and community soil absorption field at Park City; upgraded existing Horse Cave and Cave City treatment plants; conveyance facilities to transport treated wastewater from Cave City plant to Horse Cave; additional on-lot treatment systems at Munfordville; and pump station and force main to convey treated wastewater to Green River discharge point

Alternative 6: Same as Alternative 5, except for the development of a wastewater collection system and an extended aeration treatment facility at Park City; also, Park City treated wastewater would be conveyed to Cave City, where both Park City and Cave City wastes would be disposed of through subsurface discharge.

Alternative 7: Same as Alternative 4, except that Cave City wastes would not be transported to Horse Cave but would be disposed of through a spray irrigation land application system during the dry season and subsurface discharge during the wet season.

Alternative 8: Same as Alternative 5, except that Cave City effluent would be disposed of through subsurface discharge.

Figure III-1 provides a schematic illustration of the eight EIS alternatives. Table III-1 provides the results of the present worth analysis for these alternatives.

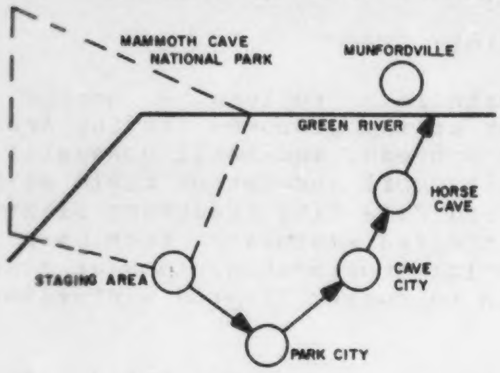
The no-action alternative was developed and compared with the most cost-effective structural alternative with respect to cost, operability, and implementability.

C. DESCRIPTION OF THE PREFERRED ALTERNATIVE

The underlying theme of the EIS is that the provision of wastewater services should be compatible with efforts to preserve and protect this area's nationally significant cave systems and their unique physical, biological and historical resources. It is, therefore, incumbent upon EPA to explore all available mechanisms to achieve an environmentally sound alternative that is sensitive to economic realities. The selection of the least costly alternative is not EPA's only aim, but rather the selection of an environmentally protective alternative that is locally affordable. In this regard, a regional system is viewed as the environmentally preferred option. However, local economic constraints dictate that other environmentally acceptable options be pursued.

In light of the concerns regarding cost and the protection of the cave resources, the approach recommended by EPA is a phased approach which, depending on local decisions, will ultimately result in a

MAMMOTH CAVE AREA E.I.S. ALTERNATIVES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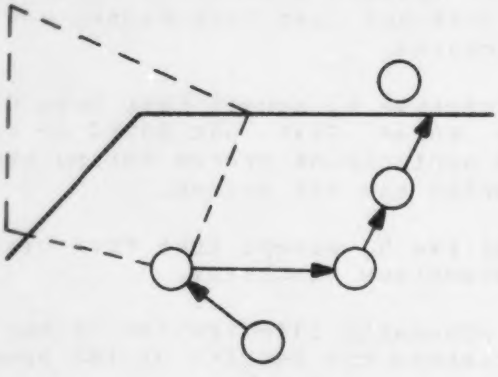
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
STAGING AREA
CAVE CITY
PARK CITY

NO. 1



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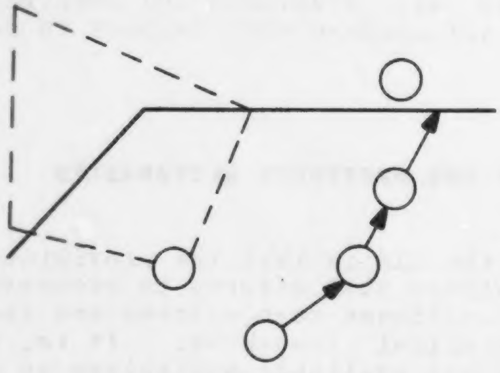

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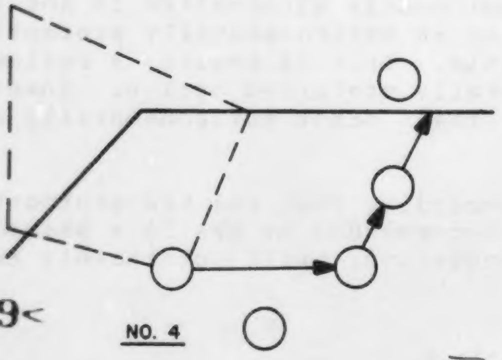

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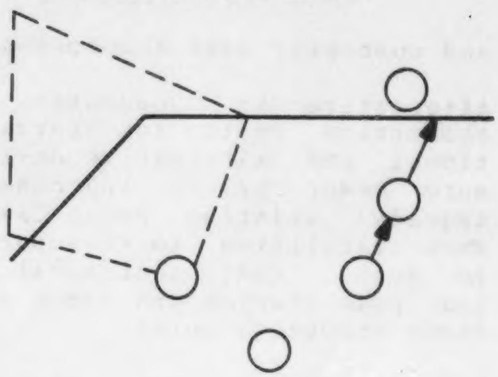

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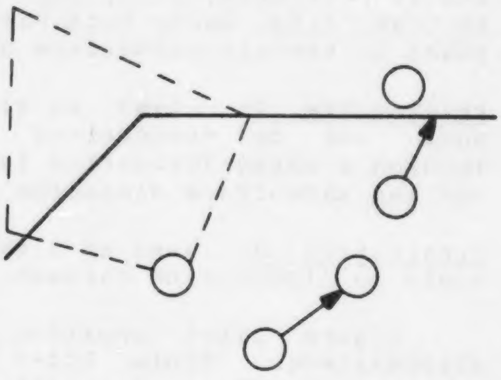

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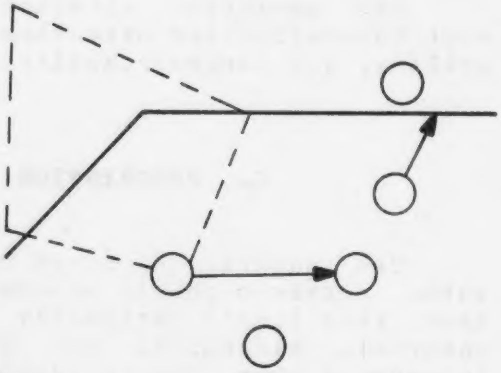

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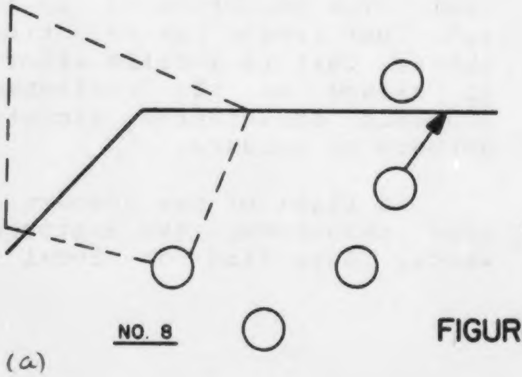

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FIGURE III-

III -3 (a)

TABLE III-1

PRESENT WORTH ANALYSIS
UPDATE

Wastewater Management Alternative	1981 Project Cost	Annual O&M Costs	Present Worth Annual O&M Costs	Total Present Worth	Year 2000 Salvage Value	Present Worth Salvage Value	Net Present Worth	Cost Ranking
Alternative 1 (SA-PC-CC-HC)^2 plus MN-1*	9,985,000	233,000	2,255,000	12,240,000	4,494,000	1,395,000	10,845,000	7
Alternative 2 (PC-SA-CC-HC)^2 plus MN-1*	10,574,000	261,000	2,527,000	13,101,000	4,770,000	1,481,000	11,620,000	8
Alternative 3 SA plus (PC-CC-HC)^3, plus MN-1*	8,804,000	237,000	2,294,000	11,098,000	4,007,000	1,244,000	9,854,000	5
Alternative 4 PC-2 plus (SA-CC-HC)^3 plus MN-1*	9,030,000	252,000	2,439,000	11,469,000	3,626,000	1,126,000	10,343,000	6
Alternative 5 SA plus PC-2 plus (CC-HC)^8 plus MN-1*	6,546,000	230,000	2,226,000	8,772,000	2,568,000	797,000	7,975,000	2
Alternative 6 SA plus (PC-CC)^2 HC-4 plus MN-1* plus filters**	7,834,000	235,000	2,275,000	10,109,000	3,467,000	1,076,000	9,033,000	
	338,000	22,000	213,000	551,000	9,400	29,000	522,000	
	8,172,000	257,000	2,488,000	10,660,000	3,561,000	1,105,000	9,555,000	3
Alternative 7 PC-2 plus (SA-CC) plus-HC-4 plus MN-1*	8,675,000	252,000	2,439,000	11,114,000	3,412,000	1,059,000	9,704,000[1]	4

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TABLE III-1 (continued)
PRESENT WORTH ANALYSIS
UPDATE

Wastewater Management Alternative	1981 Project Cost	Annual O&M Costs	Present Worth Annual O&M Costs	Total Present Worth	Year 2000 Salvage Value	Present Worth Salvage Value	Net Present Worth	Cost Ranking
Alternative 8 SA plus PC-2 plus CC-3 plus HC-4 plus MN-1*	5,576,000	228,000	2,207,000	7,783,000	2,031,000	630,000	7,153,000	1
plus filters**	300,000	21,000	203,000	503,000	84,000	26,000	477,000	
	5,876,000	249,000	2,410,000	8,286,000	2,125,000	656,000	7,630,000	

1 This net present worth is adjusted for 15 % cost preference for (SA-CC) spray irrigation and pretreatment facilities.

*MN-1 Cost estimates do not provide for upgrading of the Munfordville wastewater facility.

** Filters are only considered for Cave City.

NOTE: All costs have been developed to accommodate flows from Park City and National Park Service Staging Area.

regional (Alternative 2) or semi-regional (Alternative 5) wastewater management system.

This approach would involve the following components:

1. Initiate Phase I of the project which would provide for design for upgrading the treatment facilities at Cave City (0.37 mgd) and Horse Cave (0.53 mgd) and for conveyance facilities to the Green River. The conveyance facilities would be evaluated with and without future flows from Park City (0.08 mgd), the proposed Mammoth Cave National Park Staging Area (0.105 mgd), and the Route 70 area.

2. The establishment of a critical decision date to coincide with completion of the preliminary design for Horse Cave and Cave City for the NPS's decision regarding the development of the proposed Staging Area or the local communities' commitment to obtain additional non-EPA funding sources.

3. Provide final design for facilities based on the above decisions. At that point, EPA and the Commonwealth of Kentucky will also have to define the extent of EPA eligibility for remaining design and construction.

   - If the NPS does develop the Staging Area and is able to provide significant funding assistance for Park City or additional non-EPA funds are available, the remaining components of the regional alternative could be constructed. These construction elements would involve treatment facilities at Park City and the Mammoth Cave National Park Staging Area, conveyance facilities from Park City to the Staging Area along Route 70 to Cave City and expand Cave City's facility to 0.58 mgd. This would, in essence, be Alternative 2.

   - If the NPS does not develop the proposed Staging Area or additional non-EPA funds are not available, the remaining components of a semi-regional alternative would be constructed. This construction element would involve on-lot systems for Park City's residential areas and a community sub-surface absorption field for the Park City business district. Presently available funding mechanisms would allow for EPA participation in the cost of these activities but would be contingent on Congressional continuation of these mechanisms. Also, funding would have to be in accordance with the State Priority list. This would, in essence, be Alternative 5.

The regional alternative is most responsive to local and the NPS desires regarding protection of the groundwater and the cave systems.

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However, because of high cost and the resultant financial burden to be seen locally, the regional alternative may not be viable at this time. Local funding decisions to be made in the near future are critical to the ultimate wastewater management system for this area. Additional non-EPA funds must be available for a regional system to be affordable to Park City. Until the appropriate decisions related to NPS funding or other non-EPA financial assistance are made, EPA should move to resolve existing wastewater management and water quality problems. In essence, the proposed phased approach would allow for resolving the current more serious problems while remaining flexible to future local funding decisions. Figure III-2 describes the proposed strategy for wastewater management in the study area. A summary of the costs of the preferred wastewater management alternative is presented in Table II-1 in Section II.C. of this document.

D. DESCRIPTION OF THE STUDY AREA

The Mammoth Cave study area is located in south central Kentucky, about 100 miles southwest of Louisville, Kentucky and 100 miles northeast of Nashville, Tennessee. The 201 Planning Area is partially situated in Barren, Hart and Edmonson Counties, and includes the municipalities of Munfordville, Horse Cave, Cave City and Park City as well as portions of Mammoth Cave National Park.

As is characteristic of the Central Kentucky karst, in which the study area is situated, the terrain of the study area is gently rolling and pitted with sinkholes while the subsurface contains a complex structure of limestone caves and free flowing groundwaters. The area's unique geological features are of national interest and provide the area with a strong tourist attraction. Other than the tourist industry, the study area and surrounding region is primarily rural/agricultural.

1. Existing Natural Environment

The study area has a variable continental climate with wide extremes in both temperature and precipitation. Bowling Green, 30 miles southwest of Mammoth Cave, has the closest weather stations with complete records. The average annual temperature is about 59° F, with 100 year extremes of -21°F and 113°F. Precipitation is well distributed throughout the year and averages about 49 inches per year. The average daily wind speed for the entire year is between 6 and 7 m.p.h.

Because the area is primarily rural, severe air pollution problems do not occur. Portions of the study area do, however, suffer odor problems. The major odor problem is associated with the sub-surface discharge of the Horse Cave Treatment Plant. The combination of metal laden effluent from the Ken-Dec Metal Plating Plant, creamery waste from the Hart County Creamery, and ineffective treatment from the treatment plant have produced major odor problems in the

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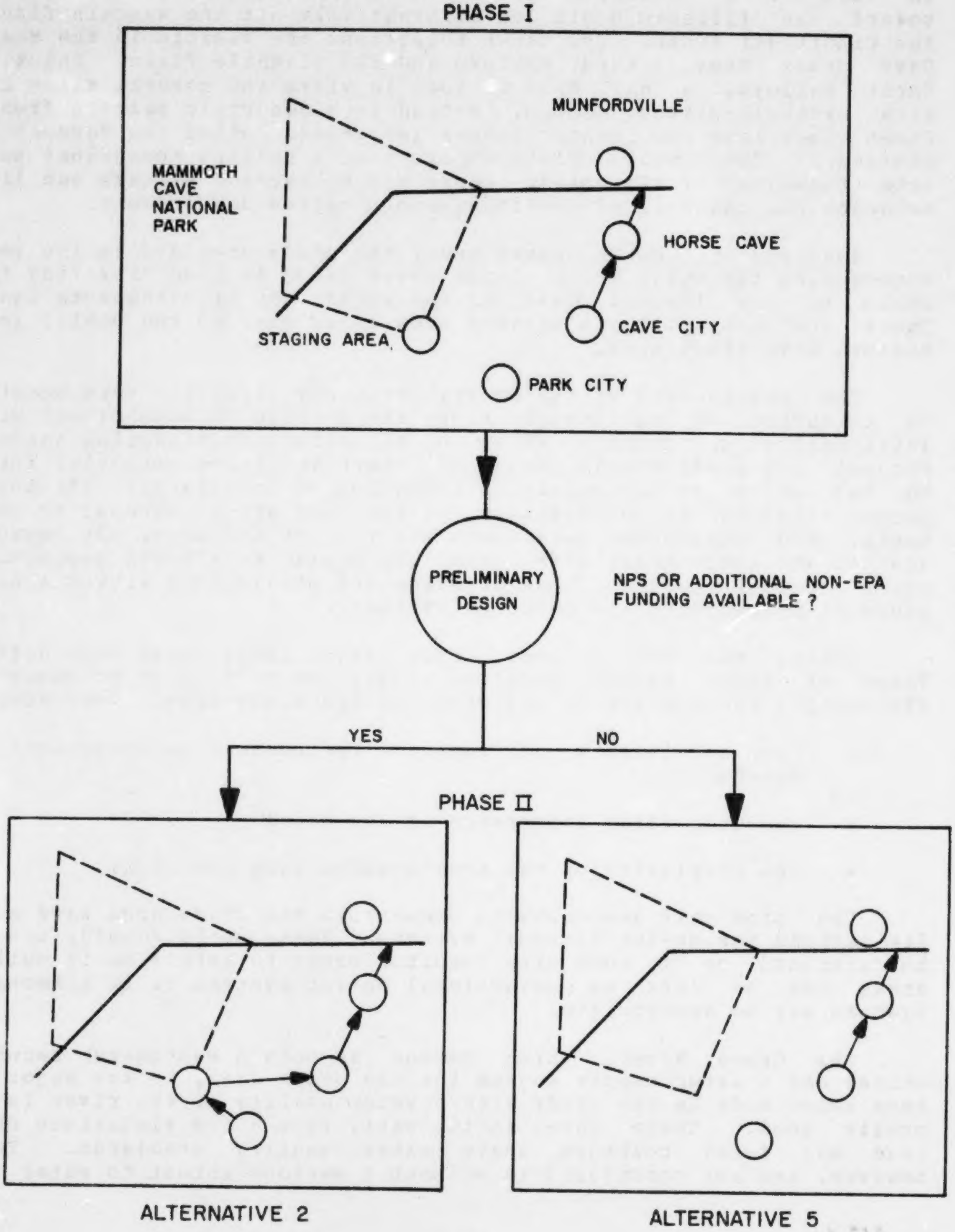
FIGURE III-2

MAMMOTH CAVE AREA PREFERRED STRATEGY FOR WASTEWATER MANAGEMENT


PHASE I
MUNFORDVILLE
MAMMOTH CAVE NATIONAL PARK
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
PRELIMINARY DESIGN
NPS OR ADDITIONAL NON-EPA FUNDING AVAILABLE ?
YES
NO
PHASE II
ALTERNATIVE 2
ALTERNATIVE 5

Hidden River system in downtown Horse Cave. Overall, the study area has relatively low ambient noise levels. The major noise generators are the highways and railroad.

On a very general level, the structural setting of the study area is that of a monocline with beds dipping gently to the northwest toward the Illinois Basin (or alternatively off the western flank of the Cincinnati Arch). Two karst formations are visible in the Mammoth Cave Study Area - karst valleys and the Sinkhole Plain. Solutional Karst valleys, a half mile or more in width and several miles long, with sinkhole-pitted floors, extend in a dendritic pattern from the Green River into the Chester Cuesta (sometimes called the Mammoth Cave Plateau). The Sinkhole Plain consists of a rolling topography pocked with thousands of sinkholes. There are no surface streams and little evidence for channels or distinguishable valley development.

Hundreds of caves abound under the study area and in the region surrounding the study area. These caves range in size from tiny fragments to the longest cave in the world- the Flint-Mammoth System. There are presently six private show caves open to the public in the Mammoth Cave study area.

The Cave systems of the Central Kentucky Karst are very sensitive to intrusion of pollutants from the surface through either direct infiltration of surface water or by pollutants traveling laterally through low level stream passages. There are three potential threats to the caves as the result of intrusion of pollutants: (1) Loss of scenic value due to contamination of the cave air or streams by pollutants, and subsequent threats to the tourist industry, (2) Damage to aquatic and terrestrial life forms, (3) Damage to mineral deposits and other special features, some of which are stable only within a narrow range of temperature and relative humidity.

During the EIS process, four major issue areas were defined. Three of these issues revolved around the protection of these cave systems and the subsurface hydrology of the study area. They are:

- the sensitivity of the cave environment to wastewater discharges
- resource value/importance of the caves
- the complexity of the area's subsurface hydrology.

The nine soil associations present in the study area have severe limitations for on-lot disposal systems. These soils should, however, be examined on a more site specific basis to determine if outlying areas can be left on conventional on-lot systems or if alternative systems may be appropriate.

The Green River, which serves as both a wastewater receiving stream and a water supply source for the study area, is the major surface water body in the study area. Water quality of the river is generally good. There have, in the past, been a few violations of the lead and fecal coliform state water quality standards. These, however, are not considered to present a serious threat to water quality. There are few additional surface streams in the study area other than the Green River because of the hydrologic conditions associated with the Karst geology.

The Green River is the hydrological base level for the region and receives most groundwater discharge from the study area. Water is collected in once of four catchment areas of the study area. This water then either returns to the atmosphere through evapotranspiration or enters the underground system through infiltration, sinking streams or internal runoff. The surface drainage basins, large sinkholes, and the Karst Valleys all serve to concentrate the water as runoff before it enters the groundwater system. The water then enters the ground at a very localized swallow point.

There are several additional characteristics of the study area subsurface resources which reinforce the complex nature of the study area subsurface hydrology. These include:

1. The geology and topography of the study area combine to create conditions for the formation of several perched aquifers above the basal water table.

2. Underground drainage in the karst follows well-defined flow paths which could be considered underground streams.

3. A series of 81 springs along the Green River between Munfordville and Brownsville are outlet points for water collected in the Karst aquifer.

The most extensive data on groundwater quality in the study area are contained in published reports by James F. Quinlin and Donald R. Rowe, Ph.D., Hydrology and Water Quality in the Central Kentucky Karst Phase II Part A. Data indicate that the Hidden River Cave South Branch is heavily polluted with respect to toxic heavy metals due to the effluent discharge of the Horse Cave wastewater treatment facility and that the East Branch of Hidden River Cave is relatively unpolluted with heavy metals. In addition, results from analyses of the Hidden River effluent-bearing springs indicate that, even under base flow conditions, sufficient dilution is available in the Hidden River system to reduce concentrations of heavy metals at the springs to within drinking water standards.

In order to expand on the Quinlin-Rowe data base and to provide additional data, GFC&C, Inc. conducted a field sampling program as part of the EIS. The sampling program was conducted in two phases, the first phase during moderate flow conditions (March 1978) and the second during base flow conditions (September-November 1978). During both moderate and base flow conditions one-time grab samples were collected at each sampling location. Twenty-six sampling stations were selected at several locations including the Turnhole Spring Basin, the Echo-Styx Basin, the Hidden River Basin, and major wastewater sources in the Hidden River Basin.

Based on the water quality analyses results from both moderate and base flow sampling, it appears that, with the exception of the polluted waters in the Hidden River Cave System and areas of local chloride pollution in the Turnhole Spring Basin, the water quality of the sinking streams and subsurface waters in the study area is generally good to excellent, sufficient for maintaining aquatic life (the aquatic life water quality criteria are defined by the EPA Quality criteria for Water, EPA, Washington, D.C. July 1976). There are undoubtedly several areas of undetected local subsurface pollution problems in the study area, though they do not significantly affect overall water quality.

The cave systems of the Mammoth Cave area contain extremely diverse cave biota. Approximately 200 different animal species have been collected in Mammoth Cave. The cave biota of the area is extremely sensitive to surface and subsurface pollution activity. The pollution effects on cave biota can be generalized into two categories: direct toxic effects and habitat modifications. Several pollutants have generally been shown to be directly toxic to cave species, including heavy metals and chlorine. Specific impacts on cave biota, however, are seldom observed and are difficult to estimate. However, the study area is distinctive in that it has comparatively extensive biotic survey work both in terms of number of sites attracted and length of observations per site. The long term observation of Hidden River Cave has permitted the documentation of pollution impacts to this cave system. The documented causes (and potential causes) of cave pollution in the study area (subsurface discharges, septic systems, urban runoff, pipeline leaks, transportation accidents, storage facility leaks and dumping activities) have demonstrated severe impacts to cave systems.

The predominance of subsurface drainage in the study area has a tremendous influence on the aquatic community. Generally, the aquatic invertebrate communities in the sinking streams and springs of the area have a low density, but often contain pollution intolerant species. An overall assessment of invertebrate samples collected for this study indicates that pollution impacts to major streams is minimal. There were no fish kills reported in the study area from 1975 to 1977, and there is no indication of the fish community being impacted by the current pollution loads.

The terrestrial environment of the study area has been modified by the clear cutting of forests and farming. Currently, total farm areas account for approximately 57 percent of the study area with over 36 percent of that land under cultivation. Forest area calculations account for almost 43 percent. The complex plant communities of the study area and the protection afforded by Mammoth Cave National Park support a diverse animal community.

The U.S. Fish and Wildlife Service (FWS) currently list 15 rare and endangered species which may be found within the four counties of the study area (Hart, Barren, Edmonson, and Warren). The FWS refers to these as "species of concern".

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2. Existing Man-made Environment

There are five population centers within the Mammoth Cave Study Area. They are the towns of Munfordville (1980 population, 1,788), Horse Cave (1980 population, 2,019), Cave City (1980 population, 1,997), and Park City (1980 population, 603). The Mammoth Cave National Park may also be considered a population center during the summer months because of the large number of tourists visiting the park. "Cave Country" visitation also significantly increases the summer populations in the towns of Horse Cave, Cave City and Park City as they provide tourist accommodations. The study area outside the towns is sparsely populated, with only about 30-40 people per square mile. Population projections for the study area developed by BRADD and GFC&C, Inc. indicate insignificant increases in population for the four communities. Year 2000 projections by BRADD are: Munfordville (1,614), Horse Cave (3,093), Cave City (2,470), and Park City (723).

Land use in the study area generally falls within one of three categories - agricultural, forested or vacant land use. The four small communities of Munfordville, Horse Cave, Cave City, and Park City serve as centers of residential, commercial and industrial land use in the study area.

One of the greatest influences on land use in the study area is the Mammoth Cave National Park. The major impact of the park and increasing visitation has been the proliferation of tourist related activities in the area such as motels, restaurants, service stations, and campgrounds. Most of this activity has focused around the I-65 interchange at Cave City where a variety of commercial activities related to the parks tourism have been developed. Other minor commercial activity has developed at the I-65 interchanges at Park City and Horse Cave.

Future land use is expected to reflect the influence of Mammoth Cave National Park. One major impact on future land use would be the park's plan to construct a new staging area at Chaumont on the periphery of the park. Location of this staging site could have a significant influence on the I-65 interchange at Park City since this exit would be the closest to the proposed terminal and staging area. This could result in a proliferation of tourist services in the area between Park City and the park entrance. Overall, however, no dramatic changes in land use in the study area are expected to occur regardless of the influence of the National Park.

The two largest employers in the study area are agriculture and manufacturing. Data indicate overall increases in manufacturing employment for each county between 1971 and 1976, and an increase in agricultural employment for the same time period in Barren County and decreases in both Hart and Edmonson Counties.

In addition to containing one of the nation's leading natural resources (the Flint-Mammoth Cave System), the Mammoth Cave National Park is also the most important recreational resource in the area. The study area itself also has the potential for increased recreational facilities. There are many caves on private property that would provide spelunkers with a variety of caves. The large amounts of marginal agricultural land and forested areas could be used for campgrounds. In 1952, 217,015 persons visited study area caves. By 1975, this figure had increased to 650,000. During those same years the park experienced a 400 percent increase in visitation from 400,000 to 2,000,000 visitors.

The majority of the land area in the study area is in agricultural and silvicultural use. Agricultural lands are used for both crops and pasture. The forested areas are primarily eastern red cedar, scrub oak and hickory hardwood. A section of the study area contains high calcium limestone reserves that are heavily mined. Oil and natural gas resources within the study area are located around and north of Glasgow, the eastern tip of Warren County, west of Munfordville, near Cave City, east of Hiseville, in northeastern Barren County and southeastern Hart County.

The Horse Cave wastewater treatment facility is a high rate trickling filter plant designed for a hydraulic loading of 0.4 mgd and a BOD_5 loading of approximately 870 lbs/day. Treated effluent is discharged to the subsurface where it flows to the South Branch of Hidden River Cave. The Horse Cave wastewater collection and treatment system serves about 90 percent of the water customers within the city's corporate limits, including two industrial customers, the Hart County Creamery and Ken-Dec, Inc. An additional interceptor to service the commercial establishments at the Horse Cave I-65 interchange was recently constructed. Results of sampling performed at different times during the past three years at the Horse Cave plant, indicated unsatisfactory performance. Slightly over 50 percent of the daily average flow is untreated industrial wastewater from the Hart County Creamery and Ken Dec's electroplating plant, resulting in influent high in BOD and heavy metals concentrations. Visual inspection of the facility (in September 1977 and March 1978) revealed that there is little biological growth on the trickling filter media and that the anaerobic digester is no longer operational, conditions apparently the result of toxic effects of chromium, copper and nickel.

The Horse Cave treatment plant cannot provide secondary treatment under these conditions. Improved operations are expected with the installation of pre-treatment facilities at the Ken-Dec electroplating plant which should reduce heavy metals concentrations to levels acceptable to permit biological treatment activities. However, unless pre-treatment of the Hart County Creamery's wastewater is provided to reduce influent BOD, the Horse Cave treatment plant cannot be expected to produce the secondary treatment effluent for which it is designed.

The Munfordville wastewater treatment plant is a 0.15 mgd extended aeration facility which discharges to the Green River about 200 feet downstream from the Highway 31W bridge in Munfordville. The System serves approximately 50 percent (250 customers) of the population of the community. Latest NPDES self-monitoring data and Kentucky Compliance Monitoring Analyses indicate that the plant is performing well, providing BOD_5 reductions of about 95 percent and suspended solids reductions of about 90 percent. However, because there are no disinfection facilities, the plant effluent is in constant violation of NPDES fecal coliform limits. Some improvements are required immediately at the plant to meet Federal and State regulations, including continuous flow monitoring, disinfection facilities, and post aeration to meet NPDES dissolved oxygen requirements. Plant performance and flow monitoring data indicate that there is capacity to expand the present sewerage service area. However, flows should be carefully monitored during wet-weather periods to confirm this conclusion and to determine the amount, if any, of additional capacity.

The Cave City treatment plant provides biological wastewater treatment by means of a high-rate trickling filter with a design capacity of 0.32 mgd. The system is maintained within the corporate limits of Cave City and serves about 600 customers (about 90 percent of the population) including commercial establishments. The treatment plant is located near the L & N Railroad tracks and is surrounded by open fields. Therefore, there appears to be ample space at the site for expanding and upgrading the treatment facilities. Data indicates that the Cave City treatment plant is not providing the level of treatment required by its NPDES permit. However, even with ideal operating conditions the treatment facility cannot be expected to meet these stringent discharge limits since the high rate trickling filter is designed to provide only secondary treatment (85 percent BOD removal). During the summer months, when efficiency should be at a peak, plant BOD_5 removals are only 76 percent even when loaded below design capacity.

The Mammoth Cave National Park wastewater facilities consist of a high rate trickling filter plant with a design capacity of 120,000 gpd. Should the need arise, there is adequate space at the treatment plant site to accommodate additional treatment units. Visual inspection of the plant has revealed that the plant is well operated and maintained. Data indicate that the plant consistently provides secondary (or better) treatment in compliance with its NPDES regulations. High flow during wet weather periods indicates the existence of an infiltration/inflow (I/I) problem in the Mammoth Cave system. Assuming the I/I problem can be eliminated, there appears to be sufficient capacity to accommodate greater wastewater flows due to the increased park visitation anticipated in the National Park Master Plan. Based on these projections, the plant appears to have adequate capacity to continue to provide secondary treatment until the mid 1980's.

Wastewater generated from activities at the Job Corp's Great Onyx Civilian Conservation Center is treated in three waste stabilization Lagoons. The design capacity of the system is approximately 20,000 gpd to provide for a population of 200 at the center. Monitoring data indicate that the lagoon system is consistently providing secondary (or better) treatment, meeting the conditions of its NPDES permit.

There are eleven small wastewater treatment plants located in the study area, most of them near the municipalities of Park City, Cave City and Munfordville. Nine of these plants have either direct or indirect discharges to groundwater. Five discharge directly to the sub-surface via sinkholes. Four discharge to lagoons with no outlet, but the water percolates into the ground. Because of the nature of the wastewater, the relatively small flows and because there are no known water quality problems associated with such plants, it is presently assumed that impacts are minimal.

Other study area practices which may be contributing to groundwater pollution problems are direct discharge of wastewater to rock openings and the use of septic tanks with absorption fields. The municipality of Park City, in particular, constitutes a large source of untreated wastewater entering the groundwater system. Approximately 80 percent of the residences and businesses in Park City discharge untreated wastewater directly to the subsurface, while the remaining 20 percent have septic tanks followed by direct discharge. Although the overall effect of these discharges is undetermined since little is known about the assimilative capacity of underground streams, several instances of fecal contamination of individual domestic water supplies have been reported.

Two additional potential groundwater pollution sources are non-point sources (use of fertilizers and pesticides or large scale livestock production) and contamination from oil wells.

There are three major sources of water supply in the study area: groundwater, groundwater springs, and the Green River. Groundwater wells are used extensively for home water supplies in areas unserved by public supplies. In addition, groundwater is used for semi-public supplies such as campgrounds and motels. Groundwater springs presently provide a source of water supply in Mammoth Cave National Park and the source of water supply for the Green River Valley Water District. Because of the extensive use of the groundwater as a water supply source, it is important that groundwater quality goals be determined and met through the resolution of local groundwater pollution problems.

There are several projects or programs in the study area which are relevant to wastewater facilities planning and water quality management including: Green River Basin 303(e) Plan, Comprehensive Water and Sewer Plan for the Barren River Area Development District, Mammoth Cave National Park Master Plan, and the Mammoth Cave National Park Transportation Study.

E. ENVIRONMENTAL IMPACTS OF THE PREFERRED ALTERNATIVE

Major impacts to the existing natural environment with implementation of the preferred alternative are not expected. As a matter of fact, in the case of, for example, Subsurface Water Resources and Cave Ecology, major impacts are expected to be beneficial. These impacts are basically the result of removal of wastewater from the subsurface and reduced dependence on faulty septic systems, aiding in the correction of groundwater pollution problems.

Generally, impacts associated with the natural environment are the result of construction of pipeline or facilities. The basic assumption is that impact is generally proportional to distance of pipeline. This holds true when considering short-term impacts to air

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quality, impacts to geology, topography, noise, surface (in terms of sediment load) and subsurface water resources, cave ecology, and surface ecosystems. Each of these parameters is expected to be impacted to some degree by construction activities. This potential impact would be greater with implementation of the regional alternative option of Phase 2 because of the extent of proposed construction. The semi-regional option of Phase 2 on the other hand, requires the next to the least amount of construction and, therefore, the potential for construction-related impact is limited. In addition to pipeline construction, leakage from pipelines could also have major adverse impacts. This is particularly true when considering impacts to subsurface water resources. Again, impact is assumed to be proportional to pipeline distance.

Several other impacts to the natural environment are expected in addition to the effects of construction. A long-term impact to air quality could be the result of operation of newly constructed facilities in the regional system option of Phase 2. The removal of wastewater from Hidden River Cave will correct the worst odor problem in the area, however, the composting waterless toilets recommended for the proposed Staging Area in the semi-regional option of Phase 2 have the potential to cause odor problems if the wastes are not composted properly. An additional odor problem could result from improperly maintained treatment facilities constructed in the preferred alternative.

In addition to construction impacts, the geology of the study area could be adversely affected should ponding occur with application of the community soil absorption field proposed in the semi-regional option of Phase 2 of the preferred approach. Subsurface water resources and cave ecology also could be negatively impacted by the use of improperly installed, operated or maintained soil absorption fields.

Impacts to soils in the area are not expected to be highly significant. There is the potential for soils to become clogged should on-lot systems be improperly designed, installed or constructed in those areas not served by a central collection and treatment system.

Potential degradation of the Green River aquatic community could occur with complete failure of pretreatment for heavy metals or malfunction of the treatment plant at Horse Cave or Cave City. The extent of the impact would depend upon the quality of effluent. Short term and long term impacts resulting from construction are expected. Impacts include increased siltation from pipeline construction on the floodplain and removal of vegetation during construction and from changing land use. These impacts have the potential to affect aquatic and terrestrial species and their habitat.

The habitats of several protected or formerly proposed species could be influenced by activities in the study area. For instance, three mussels found in the area could be impacted in two ways by placement of the discharge pipe to the Green River. First, possible mussel and mussel habitat destruction could occur by excessive sedimentation during construction, and secondly, possible toxic substances in the effluent could harm the mussels. Some beneficial impacts could

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also be realized, particularly in the case of the Kentucky cave shrimp. Removal of all subsurface wastewater discharges of the regional system option of Phase 2 in the preferred alternative afford the greatest amount of protection to the cave shrimp from the influence of wastewater.

In the Mammoth Cave area, it is not expected that extensive population growth will result from any new wastewater facilities, first because population projections for the area are conservative, and secondly because the proposed wastewater facilities will include only limited new service area and, therefore, will not act as a direct stimulus to population growth. Sewering of the Route 70 area and construction of collection and treatment facilities at Park City in the regional system option of Phase 2 of the preferred alternative may stimulate some additional population growth, but it is not expected to be significant.

Some impacts upon land use may occur in the study area as the result of upgrading treatment facilities at Horse Cave and Cave City, development of a community sub-surface absorption field (the semi-regional system option of Phase 2 of the preferred alternative), and construction of new facilities (the regional system option of Phase 2 of the preferred alternative). Sewering of the Route 70 area may also act as a stimulus to additional growth in the study area. In addition, the right-of-way areas for interceptors and force mains in the preferred alternative will be permanent changes in land use.

The impact upon the local economy will come from both the short term construction impacts and the long term investment from the improvement of wastewater treatment in the study area. It is likely that the project would create construction employment and would also pump additional money into the local economy for the purchase of housing, equipment, and materials. The long term impacts of the preferred action and the resultant improved wastewater management include:

- Potential stimulus of industrial growth
- Potential increase in visitors due to improvement of water quality in the Hidden River Cave system
- Removal or improvement in quality of subsurface wastewater discharges that drain through and could potentially impact Mammoth Cave National Park's resources.

During the EIS process, a major concern was the ability of the local communities to pay for an environmentally sound management system. Taking into consideration the relatively high unemployment rate and low per capita income of the study area, a semi-regional system having the next to the lowest net present worth cost of all the alternatives was selected (the semi-regional system option of Phase 2 of the preferred alternative), with eventual regionalization of the system if the National Park Service constructs the Staging Area. The regional system option of Phase 2 (Alternative 2) has the highest net present worth cost of all alternatives. This phase, if implemented, has the potential to place somewhat of a greater financial burden on the local communities than the semi-regional approach.

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It is expected that some interruption of normal highway traffic could be caused by construction of conveyance facilities. Under the preferred alternative, a force main would be constructed to the Green River to convey treated wastewater from Horse Cave and Cave City. Although a specific corridor for the force main has not been selected, the force main would cross I-65, which would require tunneling under the interstate highway. This however, is not expected to disrupt traffic on I-65.

F. MITIGATIVE MEASURES, RECOMMENDATIONS AND REQUIREMENTS

For the most part, mitigation of adverse impacts to the natural environment would entail implementation of controls during construction activities. Methods used to avoid adverse impacts to air quality, odor, noise, geology, soils, surface water quality, and aquatic ecology involve:

- utilization of best management practices (sludge management techniques to reduce odor, erosion and sedimentation control plans, bank stabilization and immediate revegetation plans, controls to reduce non-point source run-off from construction sites, dust containment practices)
- effective construction equipment (including sound devices) and maintenance of equipment (meeting current emission standards)
- minimize amount of land under construction at one time and limitations on time construction takes place
- effective land use control to prevent residential development adjacent to treatment sites

In order to mitigate impacts to water resources, cave ecology, and rare and endangered species as a result of pipeline leakage and sedimentation, detailed design and construction of pipeline should be required with a series of flow meters to facilitate the detection of leaks. Effective land use control (local land use and zoning restrictions) will be needed in order to protect the cave systems of the area from degradation. A final survey of the pipeline construction site should be made prior to construction to determine the presence of the Synandra plant species in the area (it, as yet, has not been detected in the tentative pipeline sites). If any species of special concern is located in an area of possible impact from the pipeline then such species should be transplanted to other areas.

Effective management of land use through the use of planning and regulatory tools can lessen any undesirable aspects of population growth and increased residential, commercial and industrial development. These tools include comprehensive plans, zoning ordinances, easements, fee simple aquisition of land, conservation zoning district, and floodplain ordinances.

In order to avoid adverse impacts to historic and archaeological resources, a standard archaeological and historic sites survey should be completed prior to construction. Consultation with the Kentucky Heritage Commission or other agencies would determine the significance of unlisted sites, their eligibility for inclusion on the list of historic places and appropriate mitigative measures.

Any adverse impacts to recreational resources, transportation facilities, resource use, and community services and facilities, also may be mitigated through the implementation of planning tools.

Section II.F of this document details those EIS requirements to mitigate adverse or potential adverse affects of the preferred alternative. Those requirements listed will be incorporated into the project as special Grant 2 conditions.

G. EIS COORDINATION

At the outset of the Mammoth Cave EIS, a public participation program was established to provide opportunities for interested groups, individuals, and governmental agencies to participate in the development of the EIS. The focal point of this program was the establishment of a Citizen Review Committee (CRC). This committee included a variety of persons representing local/regional government, state government, industry, and interested citizens. Six meetings with the CRC were held during the development of the EIS.

In addition, throughout the development of the EIS, there has been considerable coordination with a variety of public and private agencies at the federal, state, regional, and local levels. This coordination has largely been in the form of data collection, discussions, and meetings in order to provide the necessary data for the preparation of the EIS.

The following is a list of the members of the CRC and the organizations they represent:

Name	Representing
Mayor Robert L. Bybee	Horse Cave, KY
Mayor Chester Fryer	Munfordville, Ky
Mayor Clyde Hubbard Alt: Charles Lohden	Cave City, KY
Chairman, Board of Trustees Robert L. King	Park City, KY
Elmore Larimore	Green River Valley Water District

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Ken Smith	Barren River Area Development District
Robert Deskins, Park Superintendent	National Park Service
Franz Donin	Industry
Joe Thornton Kentucky Division of Water Quality, Dept. for Natural Resources and Environmental Protection	DNREP
Tom Aley	
Nick Gunn	Industry
Otis Cagle	Industry
W. T. Austin	Citizen
Charles Neville	Citizen
Tom Chaney	Citizen
Joseph Kulesza	Cave Research Foundation

In addition to the development of the CRC, was the establishment of a Groundwater Technical Advisory Committee (GTAC). The GTAC was formed with the purpose of supplementing the input of the Citizen's Review Committee. The group consists of scientists and technical personnel who are highly familiar with the unique hydrologic and geologic conditions of the area. A major role of the group was to aid in understanding the underground environment and the flow of water in the sinkhole plain, and the impact sewage effluent would have on this natural resource. The group provided technical assistance in the development of the water quality sampling program. The five members of the group are:

Name	Representing
Mr. Mike McCann Geologist	Kentucky Division of Water Quality
Dr. William B. White Professor of Geochemistry	College of Earth; Mineral Sciences The Pennsylvania State University
Mr. Thomas Aley Director	Ozark Underground Laboratory
Dr. John Thrailkill	Geology Department

Dr. James F. Quinlin	University of Kentucky Uplands Research Laboratory

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IV. REVISIONS TO THE DRAFT EIS AND ADDITIONAL INFORMATION

Errata

Comments received concerning the Draft EIS revealed some corrections which were needed to rectify errors in the report. Below, the correction, location in text, and person or agency making the comment are given.

Page II-3, third line form bottom	The term "cost-effective" should be changed to read "cost-effectiveness"	Department of the Army, Louisville District Corps of Engineers
Page II-34, first full block	Phrase, "conveyance of Park City treatment plant." should be deleted.	Department of the Army, Louisville District Corps of Engineers
Page II-46	Sentence "Conveyance of combined Cave City - Park City effluents from Cave City pumping station to Horse Cave discharge pumping station" should be added after fifth item; sixth item should be moved to end of list; eighth item should be deleted.	Department of the Army, Louisville District Corps of Engineers
Page III-6	Last sentence of the second paragraph beginning with "Because of the nature..." should be deleted.	Department of the Army, Louisville District Corps of Engineers
Page III-13, paragraph 3	First sentence should read "No surface run-off from the EIS study area reaches the Green River."	Department of the Interior (Hoffman)
Page III-41, Item 12, paragraph 1, line 1	Line 1 should read "Most rare and endangered flora and fauna of the Commonwealth of Kentucky..."; the following sentences should be added following sentence 2, "Plant species which are candidates for Federal	Department of the Interior (Hoffman)

	listing have no Federal protection at present. There are several species within the state which may never be proposed for Federal protection although they are rare."	
Page III-41, Paragraph 2, line 10	The following sentence should be added following line 10, "These three categories refer specifically to the Smithsonian Institutions list of threatened plants, not endangered species in general."	Department of the Interior (Hoffman)
Page III-15 and III-16	The sentence, "The Kentucky Division of Water Quality and EPA apply Kentucky Water Quality Standards, as established in 40 CFR 120.21, which provide in Section 1.(2) of the Regulation WP-6-2..." should reference 401 KAR 5:031 5, Aquatic Life, and not 40 CFR 120.21.	Kentucky Department for Natural Resources and Environmental Protection, Division of Water Quality (T. James Fries)
Page III-2, Table III-5	The following are corrected water quality criteria according to Kentucky's current water quality standards as found in 401 KAR 5:031. Under use classification Aquatic Life, the Ammonia criteria should be changed from .02 mg/l to .05 mg/l; the Copper criteria should be changed from .1 times 96-hr to .01 times 96-hr; the pH standard should be changed from 6.5-9.0 to 6.0-9.0;and the Sulfides criteria should be changed from 2 mg/l to 2 ug/l. Under use classification Raw Drinking Water, the Iron and pH standards should be omitted; and the Total Dissolved Solids standard should be changed from 250 mg/l to 750 mg/l.	Kentucky Department for Natural Resources and Environmental Protection, Division of Water Quality (T. James Fries)

	Under use classification Secondary Contact, the Chromium standard should be changed from 200/100 ml to 5000/100 ml; and the pH standard, 6.0-9.0, should be added.
Page III-106 last full paragraph	Beginning with the second sentence, the paragraph should read, "the most desirable alternative is WMA-5 which is five points above the second best alternative. The second through sixth ranked alternatives (WMA-3, WMA-4, WMA-1, WMA-2, WMA-7) are separated by nine points (Alternatives 1 and 2 tied). The final two alternatives (WMA-8 and WMA-6) are clearly the least desirable with total natural environmental evaluation scores of 11 and 10, respectively."
Page III-106 and III-107; last paragraph under #3.	Second sentence should read, "the most desirable alternatives are WMA-1 and WMA-2 (tied) while the least desirable is WMA-8.

V. EPA RESPONSES TO COMMENTS RECEIVED ON THE DRAFT EIS

This section of the Final EIS contains the responses that have been made to comments in writing to EPA and oral comments made at the Public Hearing held in Cave City on June 8, 1981. Because of the limited number of comments, the responses are categorized according to the person or agency making the comment.

The first part of this section indexes written comments received on the Draft report. The second part lists those oral comments received at the Public Hearing. A detailed listing of all comments and responses is then included. Section VII includes actual letters received commenting on the Draft report.

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A. INDEX OF WRITTEN COMMENTS RECEIVED ON THE DRAFT EIS

Name/Association	Date Received	Concerning
1) Frank Kudrna Ohio River Basin Commission	May 5, 1981	Finds EIS to be consistent with the Commission's Comprehensive Coordinated Joint Plan.
2) Carl E. Kays Kentucky Department of Fish and Wildlife Resources	May 18, 1981	Supports EIS preferred alternative.
3) Robert L. Brooks Office of State Archaeology	June 3, 1981	Agrees with the need for surveys before construction.
4) William L. Schneider Sierra Club	June 4, 1981	In support of EIS preferred alternative.
5) Frank Lisella, Ph.D. Department of Health & Human Services	June 8, 1981	Agrees with major issue of EIS; is supportive of efforts to eliminate untreated discharges to sub-surface water resources and the environment.
6) Anne Armstrong Thompson Kentucky Heritage Commission	June 8, 1981	Finds EIS to be in compliance with the Advisory Council's Regulations for the Protection of Historic and Cultural Properties.
7) C. E. Eastburn Department of the Army Louisville District Corps of Engineers	June 9, 1981	Comments on various aspects of the EIS.
8) Robert D. Pacific U.S. Department of the Interior, Fish and Wildlife Service	June 11, 1981	Major deficiencies in the Rare and Endangered Species Section of the EIS as it relates to the Endangered Species Act requirements.
9) Thomas A. Scott Kentucky Department of Transportation	June 11, 1981	Indicates the need for construction permits in state's rights-of-way.

10) Jack L. Abney Environmental Planner	June 22, 1981	Inadequate consideration of alternatives and impacts of sewers in EIS; Does not agree with preferred alternative.
11) Cecil S. Hoffmann U.S. Department of the Interior	June 29, 1981	Comments on various aspects of the EIS.
12) T. James Fries Kentucky Department for Natural Resources and Environmental Protection, Division of Water	July 2, 1981	Comments on various aspects of the EIS.
13) U.S. Environmental Protection Agency, Region IV Atlanta, Georgia	-	Comments on various aspects of the EIS.

B. INDEX OF ORAL COMMENTS RECEIVED AT THE PUBLIC HEARING

Name/Association	Concerning
1) Leo Esters, Cave City Council	Does not oppose 201 Plan, but would like to deter it until they have a definite commitment from the National Park Service on the 201 study. Feels that, at least for citizens of Cave City, cost is prohibitive.
2) Dr. James Quinlin, Uplands Research Laboratory	Did not see anywhere in the DEIS, a discussion of monitoring the amount of sewage flow through the pipes. Suggests monitoring instrumentation installed at various intervals.
3) Tom Chaney, Citizen, Horse Cave	Concerned with preservation of unique underground system of the area; elimination of odor in Horse Cave; that since 40 percent of BOD in Hidden River at Horse Cave is unaccounted for, problems will still exist and money will have been wasted; protection of the known and unknown cave environmental state within the parks and that the wastewater capacity in the region is sufficient to sustain future tourist and industrial growth. Feels that entire region, and in a sense, entire country should be involved in preservation of natural resources of the study area. Concerned with any alternative which allows for groundwater discharge to flow through the Park; apparent reluctance of the Park Service to be involved to a greater extent.
4) Thomas Aley, Director Ozark Underground Laboratory	Feels that solution to problems of the area is at hand, and it should be kept in mind that the money is available now to solve problems and may not be in the future.
5) Robert Deskins, Park Superintendent, National Park Service	Park Service feels that the regional system is the best system; have not participated as fully as he would like because of lack of money. Willing to share costs for design of project, if they can come up with the money.

C. RESPONSES TO WRITTEN COMMENTS

1) Ohio River Basin Commission (Frank Kudrna)

No questions or comments requiring a response.

2) Kentucky Department of Fish and Wildlife Resources (Carl E. Kays)

No questions or comments requiring a response.

3) Office of State Archaeology (Robert L. Brooks)

No questions or comments requiring a response.

4) Sierra Club (William L. Schneider)

No questions or comments requiring a response.

5) Department of Health and Human Services (Frank Lisella)

No questions or comments requiring a response.

6) Kentucky Heritage Commission (Anne Armstrong Thompson)

No questions or comments requiring a response.

7) Department of the Army, Louisville District Corps of Engineers (C. E. Eastburn)

Comment: Define "on-lot systems" and the number of systems to be utilized. Additional "on-lot systems" may contribute to further problems (Page iv, item 1e). If so, add to Subsection 3, Page v.

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Response: The term "on-lot" system generally refers to any wastewater treatment and disposal system which is capable of properly treating and disposing of effluent on individual sites (such as parcels relating to single-family dwellings). A wide variety of on-site systems exist, with the type chosen for a given area generally being site dependent. Population projections for the town of Munfordville indicate very little growth expected to the year 2000 (see Table III-7, Page III-45 in the Draft EIS). Although it is impossible to predict the number of new on-lot systems in the Munfordville area, it is safe to assume that the number will be fairly consistent with the future population growth expected in the area. Thus far, with approximately half the population of Munfordville using on-lot septic tank/soil absorption systems, no serious malfunctions have been reported. Due to the limited growth expected, it is doubtful that the number of additional septic systems would be great, therefore serious problems associated with these systems are not anticipated.

Comment: Differentiate between "conventional and alternative on-lot" in 1d and 1e (Page v), if applicable, here and throughout the document.

Response: A "conventional" on-lot system generally refers to a septic tank soil absorption field utilizing a subsurface soil absorption field. There are numerous alternatives to the conventional system which can be utilized in the study area. They must, however, meet several criteria: 1) System must be authorized by the State of Kentucky, and 2) System must not contribute to environmental degradation while protecting public health. Additionally, cost and ease of operations and maintenance of a system are considered in selecting an alternative to the conventional on-lot system for a particular area. Available alternative on-lot systems include: septic tank with soil absorption field (bed), with alternating absorption fields, with absorption field utilizing dosing or closed loops, with leaching chambers, with mound system, with an evapotranspiration bed, with sand filters, disinfection & discharge, with seepage pits, with sloping field - serial distribution, aerobic tank with mound system, low-pressure subsurface pipe distribution, holding tank, aerobic tank with evapotranspiration bed, cluster system (2 or more users on one alternative system), waterless or low water toilet systems (5 types), dual systems (blackwater and greywater), small- diameter gravity sewers, vacuum sewers, land application, pressure sewers (grinder pump), and pressure sewers (septic tank effluent pump).

Comment: Define "other interests" (Page vi, Item 3d).

Response: The term "other interests" refers to local, regional, state, and federal officials and other interested citizens involved in the preparation of the EIS.

Comment: Second full block, "Treatment of Staging Area and Park City flows a second time at Cave City" appears unnecessary. Please explain. (Page II-34).

Response: To avoid additional wastewater pumping and to service additional areas along Route 70 it is necessary to mix treated wastewater from the Chaumont Plant with raw wastewater from along Route 70.

Figure II-4 provides an illustration of this concept.

Comment: The page (II-46) does not adequately summarize alternative (SA-PC-CC-HC)2 as to conveyance sequence and treatment sequence (Refer to Pages II-31, bottom and II-32, top).

Response: Page II-46 will be corrected to reflect the description of Alternative (SA-PC-CC-HC)2.

Comment: 1) Line sizes should be given (Figure II-3); 2) Park City force main should originate from the pump station, not from the treatment plant; 3) The conveyance line from Park City should terminate into new Cave City pumping station, not the treatment plant.

Response: 1) Line sizes are not given on any figure because this is not a design report, but rather a planning document with recommendations as to preferred approach to wastewater treatment and disposal in the area. The design stages of the project will develop line sizes; 2) and 3) the pumping stations for both Cave City and Park City are located at the same site as their respective treatment facilities. Theoretically, the lines on Figure II-3 are originating and terminating from those particular sites not from specific buildings.

Comment: 1) Show "Chaumont" on Figure II-4. 2) Force main from Park City should terminate at new pumping station at Chaumont, not at the STP. 3) Show "Tooney Ridge" on figure. 4) According to block 3, Page II-34, the Staging Area, Park City and Cave City flows are treated in the upgraded Cave City STP, therefore, the line from the Staging Area terminates at STP rather than at the pump station, as shown; 5) Figure II-5. According to block 1, page II-37, combined Park City and Cave City flow is pumped to Horse Cave pumping station, not the treatment plant, as shown. Other figures may need correction for the same reasons given for Figures II-3, II-4 and II-5.

Response: 1) & 3) Changes to base map will not be made at this point in the study. 2), 4) & 5) Refer to response to above Comment, parts 2 and 3.

Comment: Figure III-5. Noting the numerous point sources shown on this figure, it can be concluded that not enough is mentioned in the document about the fate of all existing point sources in the plans or selected plan area; in other words, which sources are phased out, which remain operating, etc.

Response: It is assumed that with implementation of the semi-regional system option of Phase 2 (Alternative 5) of the preferred alternative, all existing point sources within the Cave City and Horse Cave city limits will be picked up. Additionally, because it is along the proposed force main route, the Caverna High School would be picked up. Should the regional system option of Phase 2 (Alternative 2) of the preferred approach be implemented, the KOA Campground, the Park City Campground, the Park City School and the Southern States Feed Mill would probably be picked up. Those not picked up would probably include the Park Mammoth Resort, the Bow-Ayr Toll Plaza, the Jellystone Park and the Crystal Onyx Cave. The Mammoth Cave National Park and the Great Onyx Civilian Conservation Corps will not be included because they have their own treatment facilities. Munfordville would also not be picked up.

Comment: Page III-66. Under "Small Wastewater Treatment Plants," the statements and conclusions made in this section are based on supposition and are not valid in the absence of data. At minimum, data should be obtained for the treatment plants which discharge directly or indirectly to the groundwater to determine conclusively whether this total flow (34,900 gpd) has potential to adversely impact the groundwater in this sensitive area.

Response: The last sentence of the second paragraph on page III-66, beginning with "Because of the nature..." will be eliminated.

Comment: Section 10 of the Rivers and Harbors Act of 1899 requires that any work to be done on a "navigable water of the United States" be authorized by a Department of the Army (DA) permit. The proposed outfall site is above our Section 10 jurisdiction on the Green River and, therefore, will not require a DA permit under this section of the law.

Response: Comment does not require a response.

Comment: The Green River, at the proposed outfall site, has an average annual flow exceeding five cubic feet per second. Therefore, any placement of dredged or fill material below the Ordinary High Water (OHW) elevation will require authorization under Section 404 of the Clean Water Act.

Response: Authorization will be requested if necessary.

Comment: Backfill for utility line crossings is already authorized under the provisions of 33 CFR 323.4-3(a)(1) of our regulations as published in the Federal Register, Volume 42, No. 138, on 19 July 1977. Therefore, an individual DA permit will not be required if the streambed is returned to pre-construction contours, excess excavation material is removed to a contained upland disposal area and there is compliance to the attached special conditions.

Response: Comment does not require a response.

Comment: According to the DEIS, cofferdam construction for the outfall system would involve the building of a dirt peninsula into the river. If the selected plan includes the cofferdam construction, an individual DA permit application must be made and received before work can commence. Any questions on permit matters should be directed to the above address, ATTN: Regulatory Functions Branch, ORLOP-FS, or by calling (502) 582-5452.

Response: If necessary, a permit will be requested.

Comment: Munfordville is the only city of the four Mammoth Cave Area cities participating in the National Flood Insurance Program and is currently in the emergency phase. Being in this phase, special flood

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hazard areas have been delineated for Munfordville and certain controls are administered by the city to reduce or prevent flood damage in these areas.

Response: Comment does not require a response.

Comment: Any construction should be carefully evaluated to insure that flood damages that could be incurred by the proposed facilities are prevented or reduced. This would be applicable to such damages to other existing structures that could be caused by the proposed facilities. Construction should be evaluated to insure compliance with Executive Order 11988, Flood Plain Management. In essence, the Executive Order directs federal agencies to use practicable alternatives to construction in the 100-year flood plain, if available, and, if not, take measures to minimize the impacts of such construction.

Response: An evaluation will be made when appropriate.

8) U.S. Department of the Interior, Fish and Wildlife Service (Robert D. Pacific)

Comment: The deficiencies in the EIS as it relates to the Endangered Species Act requirements concern the need for:

1. Survey data on the extent of mussel populations, especially at site of diffuser system.
2. Secondary impacts
3. Cumulative effects
4. Efforts that will be taken to eliminate, reduce, or mitigate any adverse effects.

Response: Extensive discussions have been held between the U.S. Fish and Wildlife Service (FWS), EPA and EPA's consultants concerning the presence of protected species near the proposed discharge to the Green River. A three step process was agreed upon for the EIS. First, all protected species known or suspected to be present in the study area should be reviewed in detail to confirm or deny presence and impact from the project. If this review indicates no impact then no further action would be necessary. However, if the review does not eliminate all species then one of the two remaining steps could be required. Either biological assessment surveys could be required to demonstrate the presence or absence of the species in question or the project could assume that the species in question were present and proceed with the descriptions outlined in the FWS letter of January 12, 1981.

The process was used and reduced those species of concern from 15 (FWS letter of January 12, 1981) to three species. These three endangered mussels (*Lampsilis orbiculata orbiculata, Epioblasma torulosa turlosa, Pleurobema plenum*) are known from the Green River above Munfordville,

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KY and may exist in the study area from the proposed point of discharge downstream to the slack water associated with Lock No. 6 on the Green River. Based on this knowledge, the assumption was made that these three species do exist in the area. The EIS discusses the proposed alternative system, possible impacts to these species associated with this alternative system, possible mitigative measures which would reduce the extent of these impacts, and other measures.

The FWS has raised four specific areas of inquiry: (1) survey data, (2) secondary impacts, (3) cumulative impacts, (4) mitigative measures. The following section discusses these points.

(1) Survey data on the extent of mussel populations especially at site of diffuse system.

FWS and EPA have agreed that site surveys are not required at this time but will be required before the irreversible or irretrievable commitment of resources. It has been the position of the EIS that such surveys are within the scope of design work. A study which includes the mussel fauna of the Green River is being conducted at this time by Dr. Arthur Clarke of the Smithsonian Institution; Division of Mollusks; Washington, D.C. The results of this survey will be important information and should be incorporated into the design and construction activities associated with the outfall structures.

(2) Secondary Impacts

The secondary impacts of the proposed alternative are expected to be minor. The proposal included upgrading existing facilities at the existing population centers and the pumping of treated effluent to the Green River. The construction of this system is not expected to produce significant changes in the rate or distribution of population growth for the area. The area near the Green River is not proposed for sewering in the project.

(3) Cumulative Effects

Cumulative Effects are expected to be minimal. The probable discharge point is downstream of the Interstate Highway 65 bridge and upstream of the Lock No. 6 pool. This area is characterized by low population density and predominately steep slopes along the river. It is unlikely that other projects will have any significant impacts on this area.

(4) Efforts to Eliminate, Reduce or Mitigate Adverse Impacts

The EIS discusses primarily three areas for reduction and mitigation of impacts:

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Sedimentation impacts from construction, toxicity impacts from residual chlorine, and design measures to improve plant operation and mitigate the impacts of plant malfunctions.

Sedimentation from construction activities could have severe impacts on the river system as a whole unless properly controlled. The design and construction phases of the project will be required to address this issue in detail. Existing techniques are available to control this activity.

Residual chlorine levels and treatment plant design will be addressed in detail in the design stage of the project. The EIS has been concerned over these issues and has corresponded with the FWS on them (FWS; Asheville; NC: February 3, 1981). Again, the design phase of the project will detail the systems to control these impacts. If necessary dechlorination can be included or an alternate disinfection technique. Impacts of plant malfunctions can be controlled through enforcement of the local pre-treatment ordinance and plant design.

9) Kentucky Department of Transportation (Thomas A. Scott)

No questions or comments requiring a response.

10) Jack L. Abney, Environmental Planner

Comment: The EIS has not adequately considered or evaluated alternatives to conventional sewering such as on-site disposal.

Response: Horse Cave, Cave City and a portion of Munfordville are currently sewered and served by their own wastewater treatment facilities. It is, therefore, not appropriate to convert these currently sewered communities to an on-lot disposal system. The community of Park City, a portion of Munfordville and the homes and tourist facilities along Route 70 (Route 70 development area) are currently served by some form of on-lot system. In these areas, it would certainly be the least cost approach to maintain on-lot systems and upgrade, where appropriate. This is, in fact, the recommended approach for the Mammoth Cave area from EPA's standpoint. However, the National Park Service has expressed strong concern over the continued use of on-lot systems in areas (Park City and Route 70 area) that are drained by groundwater sub-basins that ultimately flow through the Park. In response to the Park Service's concerns the option of implementing a full regional system (by including Park City and the Route 70 area) will remain open until local funding decisions are made. Therefore, unless the Park Service provides funding or other non-EPA funding is made available to remove the financial constraints of a regional system, a semi-regional system with upgraded on-lot systems in Park City and along Route 70 will be implemented. The concerns of this comment have, therefore, been responded to in the Draft EIS.

Comment: The EIS completely ignores the problem of leaking sewers.

Response: As indicated in the Draft EIS (pages II-28 and II-44), when wastewater is conveyed from one population center to another, potential environmental benefits dictate that only treated wastewater be conveyed. The benefits to be derived from pumping treated wastewater include:

1. to avoid the development of septic conditions in the sewer lines because of long detention times and
2. in the event that line breaks or leaks occur, treated wastewater would pose a much less serious threat to the subsurface systems than would raw wastewater.

Additionally, as suggested by the National Park Service at the Draft EIS Public Hearing, flow monitoring devices will be installed at regular intervals to aid in the expeditious identification and correction of leaks or breaks.

#11 U.S. Department of the Interior (Cecil S. Hoffman)

Comment: The endangered species sections of the DEIS are inadequate as they relate to the Endangered Species Act's requirements for a biological assessment.

Response: Comments concerning the Rare and Endangered Species section and biological assessment have been addressed under the response to comments from the Fish and Wildlife Service (#8).

Comment: (Page III-41, Item 12, paragraph 1, line 1) Not all rare and endangered flora and fauna of the Commonwealth of Kentucky are currently protected by Federal legislation. Candidate plant species have no Federal protection at present and will not unless listed. There are other species within the State that, although rare, may never be proposed for Federal protection. In the same item, paragraph 2, line 10, it should be noted that the three categories addressed here refer to the Smithsonian Institution's list of threatened plants, not endangered species in general.

Response: Line 1 will be changed to read, "most rare and endangered flora and fauna of the Commonwealth of Kentucky...". Additionally, the following sentences will be added following sentence 2, "Plant species which are candidates for Federal listing have no Federal protection at present. There are several species within the state which may never be proposed for Federal protection although they are rare." The following sentence will be added following line 10, paragraph 2 "these three categories refer specifically to the Smithsonian Institution's list of threatened plants, not endangered species in general."

Comment: The National Park Service has contracted with Scruggs and Hammond, Inc. to conduct a sewerage study for Mammoth Cave National Park. The results of this study when completed will form the basis of the National Park Service's decision regarding wastewater management. We do wish, however, to express support for any upgrading of local wastewater management facilities that will prevent future pollution of the cave system.

Response: No response necessary

Comment: We note that the Kentucky Heritage Commission has recommended that a cultural resource survey of the project area be conducted. We concur with this recommendation since numerous historic and archaeological resources are known in the area, and we look forward to seeing the results of the survey. The State Historic Preservation Officer should be afforded an opportunity to review and comment on the survey report and should be consulted on the adequacy of any proposed mitigation measures. If any cultural resources meeting National Register criteria are to be affected, the Advisory Council on Historic Preservation must also be afforded an opportunity to comment. Cultural resource surveys are required by Section 110(A)(2) of the National Historic Preservation Act, as amended. The Advisory Council on Historic Preservation implementing procedures for this Act are found in 36 CFR 800.

Response: This has been noted.

Comment: It is stated that, "No surface runoff reaches the river" (page III-13, paragraph 3) in reference to Green River. That statement appears to be in need of qualification in view of the large folded map of Groundwater Basins in the Mammoth Cave Region, Kentucky, which shows a considerable number of streams reaching the north side of Green River in the northwestern part of Mammoth Cave National Park.

Response: In order to further qualify this statement it should read, "No surface runoff from the EIS Study Area reaches the Green River."

12) Kentucky Department for Natural Resources and Environmental Protection (T. James Fries)

Comment: Page ix. What is the cost difference between upgrading the Horse Cave and Cave City wastewater treatment plants versus constructing a new oxidation ditch at each city's facility.

Response: The cost comparison is performed using Alternative 5, which utilizes two stage biological treatment at Horse Cave and Cave City. As stated on page iii of the Draft EIS, the Total Project Cost for Alternative 5 when considering two stage biological treatment at Horse Cave and Cave City is $6,546,000. The utilization of oxidation ditches at Horse Cave and Cave City would increase the Total Project Cost of Alternative 5 to $7,925,000, a difference of $1,379,000. Utilization of oxidation ditches would increase the Total Present Worth cost of Alternative 5 from $7,975,000 to $10,190,000, an increase of $2,215,000.

13) U.S. Environmental Protection Agency, Region IV

Comment: Add Munfordville, Route 70 and Staging Area to Table II-1 on Pages II-8-9-10 of the Final EIS.

Response: Costs for Munfordville, Route 70 and the Staging Area have been added to Table II-1. These costs are taken from Tables II-14 to II-19 on pages II-64 to II-69 of the Draft EIS. User charges for each municipality except Munfordville, Route 70 and the Staging Area are illustrated on these tables. User costs for Horse Cave, Cave City and Park City are based on water records for those towns. These water records provide data necessary to calculate an Estimated Dwelling Unit (EDU) figure to take into account commercial and industrial users. An EDU figure is necessary in order to calculate an annual user charge for a particular area. EDU figures and, therefore, user charges were not calculated for Munfordville, Route 70 and the Staging Area for the following reasons. A user charge for Munfordville is difficult to estimate due to lack of water service records, the combined wastewater service facilities (community on-lot and conventional) in the Munfordville area (refer to Alternative MN-1), and the uncertainty of the number of customers to be connected during the planning period. The user charge for the Route 70 development can not be estimated due to an uncertainty of the number of connections on line and the lack of water service records. The Local Annual Cost for the Staging Area would be the user charge for the Park Service since the Park Service is the only customer at the Staging Area.

Comment: At Munfordville, has the upgrading of the facilities been included and costed, including; disinfection, post aeration and flow monitoring?

Response: The proposed action for Munfordville, MN-1, does not contain any cost estimates for upgrading the existing facilities to provide disinfection, post aeration and flow monitoring. It was determined at the start of the EIS that these facilities were of immediate need in order to meet the existing NPDES permit and would, therefore, not be considered as part of the EIS. However, these facilities have not yet been constructed.

D. RESPONSES TO ORAL COMMENTS

1) Cave City Council (Leo Esters)

No response required.

2) Dr. James Quinlin, Uplands Research Laboratory, National Park Service

Comment: Suggests installation of instrumentation to monitor sewage flow through pipes at various intervals.

Response: This suggestion will be included as a special requirement of the EIS.

3) Tom Chaney, Citizen

No response required

4) Thomas Aley, Director, Ozark Underground Laboratory

No response required.

5) Robert Deskins, Superintendent, Mammoth Cave National Park

No response required.

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VI. TRANSCRIPT OF PUBLIC HEARING HELD ON JUNE 8, 1981 ON THE DRAFT EIS

The following is the transcript of the Public Hearing for the Mammoth Cave DEIS held in Cave City on June 8, 1981.

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MAMMOTH CAVE AREA
201 FACILITIES PLAN
ENVIRONMENTAL IMPACT STATEMENT

DRAFT EIS

PUBLIC HEARING

Transcript of Public Hearing
held in Cave City, Kentucky,
June 8, 1981.

APPEARANCES:

Mr. John E. Hagan III, Chief, EIS Branch
Mr. Ron Mikulak, EIS Project Officer
U. S. Environmental Protection Agency
Region IV -- 345 Courtland Street
Atlanta, Georgia 30365

REPORTER: Barbara B. Kilgus
2102 Smallhouse Road
Bowling Green, Ky. 42101

Tel: 502/842-1515

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* * *

The following is a transcript of the evidence heard and the proceedings had upon Public Hearing of the Mammoth Cave Area, 201 Facilities Plan, Environmental Impact Statement, Draft EIS, before Mr. John Hagan III, and Mr. Ron Mikulak, at the Cave City Convention Center, Highway 70, Cave City, Barren County, Kentucky, Monday, June 8, 1981, beginning about the hour of 7:30 P.M., Central Daylight Time.

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MR. HAGAN: Good evening ladies and gentlemen. I would like to welcome you to this public hearing on the Mammoth Cave Area Draft Environmental Impact Statement and 201 Facilities Plan for proposed wastewater facilities in the Mammoth Cave Area.

I would like to begin the formalities tonight by introducing myself. My name is John Hagan. I am the Chief of the Environmental Impact Statement Branch, the U. S. Environmental Protection Agency in Atlanta.

On my immediate left, to your right, is Mr. Ron Mikulak who has been the Project Officer on the Mammoth Cave EIS; and on my right, to your left, is Mr. Campbell Wallace who is the 201 Facilities Plan consultant for this project.

There are several local elected officials in the audience this afternoon who signed up by the time I got the cards and I would like to recognize these folks. Mrs. Louise Stinson, Mr. Clyde Hubbard, Mr. Talley, City Attorney. Mr. Talley, we are glad to have you with us. And Mr. Esters. Glad to have you folks with us.

It is always gratifying to see elected officials come out and attend these meetings because basically wastewater treatment facilities and their operation, maintenance, and their growth of this area is really in your hands, and it is always gratifying to see you come out and participate in these formalities.

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The purpose of this evening's meeting is to receive comments from the public and other agencies on the wastewater management proposals contained in the Draft Environmental Impact Statement and the 201 Facilities Plan for the Mammoth Cave Area. These studies are being prepared under the authority of the Clean Water Act and the National Environmental Policy Act.

The Clean Water Act enables the Environmental Protection Agency to fund up to 75% of certain eligible costs for planning, design, and construction of wastewater facilities. The planning phase of this process results in the preparation of a facilities plan. In this instance, the Mammoth Cave Area Facilities Plan is being administered by the Barren River Area Development District, and I notice in the list there are several representatives of BRADD here tonight. This 201 Facilities Plan includes the municipalities of Munfordville, Horse Cave, Cave City, and Park City.

The National Environmental Policy Act requires Federal Agencies to prepare an Environmental Impact Statement on major federal actions which significantly affect the quality of the human environment. Because of the environmental complexities in the cave area and the apparent financial and management constraints of the applicant cities, EPA made the decision to prepare an Environmental Impact Statement in conjunction with this Facilities Plan. Accordingly, in October of 1977, the Notice of Intent to Prepare an EIS was issued.

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Pursuant to the guidelines of the President's Council on Environmental Quality and the Rules and Regulations of EPA with regard to the preparation of EIS'S, this Public Hearing is being held to receive your comments on the Draft EIS. The Draft EIS and Facilities Plan are being discussed in a public forum to encourage public participation in the federal decision-making process and to develop improved public understanding of the federally funded projects.

In this regard the Draft EIS was made available to the public and EPA'S Office of Federal Activities on May the 1st, 1981, and was listed in the Federal Register on May 8th, 1981. The Draft EIS Comment Period will extend until June the 22nd, 1981. The comments received during this evening's meeting and during the remainder of the Comment Period, which may be submitted in writing, will become a part of the official record.

Now before we get into the real business of the evening, which is to hear what you all have to say, Mr. Mikulak is going to provide us a very brief update on the project and what has happened todate and a brief description.

Ron, would you take the mike.

MR. MIKULAK: Thank you, John.

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MR. MIKULAK: Good evening. My name is Ron Mikulak. I am the EIS Project Officer for the Mammoth Cave Area Draft EIS, and I am also located in Atlanta, Georgia.

The Draft EIS is addressing the provision of watewater facilities for a portion of Mammoth Cave National Park and several communities nearby including, as Mr. Hagan noted, Munfordville, Horse Cave, Cave City, and Park City.

What I propose to do is to just provide you with a brief summary of what the Draft EIS has addressed, what we have gone over through the project thus far, and in doing so I am going to be using this little blue handbook that you should have picked up on your way in. If you haven't done so, I will give you a few moments to pick one up.

For those of you who may not be familiar with the study area, it is outlined on Page 2 of the booklet and, of course, encompasses those cities that I just mentioned.

As Mr. Hagan also noted, the Barren River Area Development District, the BRADD, was charged with the responsibility of administering the Mammoth Cave Area Facilities Plan. The purpose of a Facilities Plan is the development of an appropriate wastewater management strategy course for a specific area. Because of the environmental complexities in the cave area, EPA made the decision to prepare the Environmental Impact 82< Statement in conjunction with the Facilities Plan. The ob-

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jectives of these studies, therefore, were to establish what existing conditions were in the Mammoth Cave Area, to develop and evaluate wastewater management alternatives, to determine the adverse impacts associated with those alternatives, and to ultimately recommend a preferred alternative and to present this information to the public.

In preparing these studies EPA contracted with a consulting firm to provide technical assistance in preparing the EIS. That firm was Gannett, Fleming, Corddry and Carpenter out of Harrisburg, Pennsylvania, and assisted by the firm of Claude Terry and Associates out of Atlanta, Georgia, and Campbell Wallace who was contracted as the 201 Engineer in assisting the BRADD in developing the 201 Plan.

Before I discuss the EIS alternatives that were produced through these studies, I would briefly like to explain what the area's existing wastewater management system is for those of you who may not be familiar with it.

Starting on Page 3 of the handout, it is indicated that Munfordville is currently served by sewers and a treatment plant which discharges to the Green River. Both the cities of Horse Cave and Cave City are sewered and served by their own treatment facility and discharge treated effluent to adjacent sinkholes.

Park City is currently served by septic tanks. Additionally, several privately owned treatment plants are

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located throughout the area. Most of these plants either have a direct or indirect discharge to groundwater. Those areas not currently served by private plants or municipal facilities are typically served by on-lot systems, most often septic tanks.

As part of the EIS, eight (8) wastewater management alternatives were developed. These eight (8) alternatives range from a regional system involving all communities except Munfordville to local treatment and local disposal for each community. Page 4, Figure 2, in your handout provides you with a schematic representation of those eight (8) wastewater management alternatives.

The results of the evaluation of alternatives, in terms of cost, impacts to the man-made, impacts to natural environment and operability are shown on the following page, Page 5. The costs of the eight (8) alternatives that are shown are in terms what's called present worth costs. The present worth cost analysis establishes a basis for the comparison of total costs of each alternative. The total costs involved basically two parts: the capital cost or the cost of construction alternative, and then the annual operating or O & M cost over the period of the planning period.

Of the eight (8) alternatives shown on Pages 4 and 5, three, numbers 2, 5, and 8, show the greatest promise. The capital, O & M and present worth costs of these three

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alternatives are further detailed in the middle of Page 5.

Of additional concern to both the community and EPA are the estimated user costs of the alternatives. These costs have been estimated on the basis of Dollars per Equivalent Dwelling Unit per year, with an Equivalent Dwelling Unit representing the average residential user, average homeowner. Commercial or industrial users may therefore be represented in terms of numbers of EDU'S or Equivalent Dwelling Units based on wastewater flow.

The estimated annual user costs for alternatives numbers 2, 5, and 8 are shown on the bottom of Page 5. Please note that these figures do not include the existing user charges of approximately $37.00 a year for Horse Cave, and $45.00 a year for Cave City.

Pages 6 through 10 of the handout provide you with a brief description of alternatives 2, 5, and 8 as well as a discussion of the pros and cons of each.

I'd like to take the next few moments to briefly review this information with you before the Draft EIS preferred alternative is discussed.

Alternative #2 involves the following components of a regional system. And if it helps you to refer back to Figure 2 on Page 4, please do so and I won't mind the rustling of pages.

Alternative #2 involves local treatment

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facilities at each population center.

Joint disposal of all effluent, except for Munfordville, via surface water discharge to the Green River.

Existing facilities at Cave City and Horse Cave would require upgrading.

New facilities would be required at Park City and a proposed Staging Area for Mammoth Cave National Park.

Additional on-lot systems would be required at Munfordville.

An inter-city conveyance and disposal line would be required.

Among the Pros of Alternative #2 are, that it provides the greatest amount of groundwater protection from wastewater discharges.

It corrects existing water quality problems in the Hidden River groundwater sub-basin.

It corrects existing odor problems in Horse Cave.

It would exhibit the greatest overall system operability.

In the past it has received the support of the communities, environmental/conservation groups as well as the National Park Service.

It provides service to existing development along Route 70 between Park and Cave City and, therefore, affords

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protection of sensitive areas in this location from wastewater discharges.

It also received a high rating with regard to natural and man-made environmental impact.

Among the Cons of Alternative #2 are, that it has the highest net present worth cost.

The cost to the community of Park City would be prohibitive unless other funding sources could be make available.

The potential exists for development to be encouraged along Route 70.

There is currently no multi- city or county sewer authority to implement this option. All the groundwork has been laid to develop such an authority.

Considerable construction activities associated with the inter-city conveyance and disposal line, approximately 114,000 feet of gravity and force mains.

Alternative #5 involves the following components:

Local treatment facilities at each population center.

Joint disposal of only Horse Cave's and Cave City's effluent to the Green River.

Existing facilities at Horse Cave and Cave City would require upgrading.

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Additional conventional and alternative on-lot systems would be required at Park City.

Additional on-lot systems would be required at Munfordville.

The Park's proposed Staging Area would employ on-lot systems.

Among the Pros of Alternative #5 are, that it has the next to the lowest net present worth cost.

It corrects the obvious water quality and odor problems in the Hidden River groundwater sub-basin by removing Horse Cave's and Cave City's sub-surface discharges.

As with Alternative #2 it provides the greatest degree of protection of the groundwater system and cave environment for the Hidden River area.

It involves less than half of Alternative #2's construction activity for the inter-city conveyance line.

When compared to Alternative #2, the local cost is significantly less for Park City, and slightly more for Cave City, and roughly the same for Horse Cave.

If the force mains from Cave City to Horse Cave to the Green River were designed to include flows from the proposed Staging Area and Park City, this alternative could be the initial phase of what might eventually be a regional system.

88< Among the Cons of Alternative #5 are, that

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existing residential and commercial developments now using on-lot systems in Park City and along Route 70 would not be served.

The local cost to Cave City is slightly higher than #2.

The system operability is slightly less than #2.

Although the alternative does address the water quality problems in Horse Cave and Cave City, it does not receive the overwhelming support of the Park Service and other interests as did #2 because all sub-surface wastewater discharges would not be removed.

Alternative #8 involves the following elements:

Local treatment facilities at each population center.

Conventional and alternative on-lot systems at Park City.

On-lot systems at the Park's proposed Staging Area.

Cave City's existing facility would require upgrading for a sub-surface discharge.

Horse Cave's existing facility would require upgrading for surface water discharge .

And additional on-lot systems would be required at Munfordville.

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Alternative #8 has the lowest net present worth cost.

Lowest local costs for Cave City and same local cost for Park City as in Alternative #5.

Removes Horse Cave's discharge from the Hidden River Sub-basin.

It involves the least amount of construction activity for inter-city conveyance and disposal systems, approximately 36,000 feet.

Among the Cons of Alternative #8 are, as in #5, existing residential and commercial developments now using on-lot systems in Park City and along Route 70 would not be served.

Cave City's sub-surface discharge would not be removed. The potential for the Hidden River sub-basin to be adversely impacted by wastewater discharge would remain.

The option is rated lowest with regard to the impacts to the natural and man-made environment.

This option is rated lowest with regard to system operability.

This option has received the least amount of community support from the Park Service, and interested groups and individuals.

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Although wasteload allocations for a sub-surface discharges have been developed, a lesser degree of con-

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fidence is attached to these allocations than to surface water discharges to Green River.

This option would preclude the possibility of Park City or the Park Service being served by a regional system.

Rounding out my brief discussion I would just like to quickly go over what is the Draft EIS Preferred Alternative or more appropriately the Draft EIS Preferred Strategy. Starting on Page 10 in the handbook we indicate that the underlying theme of the EIS is that the provision of wastewater services should be compatible with efforts to preserve and protect this area's nationally significant cave systems and their unique physical, biological, and historical resources. The local EIS review committee and the National Park Service have voiced their support for a regional wastewater management system that would afford the greatest protection of the area's groundwater and sub-surface systems. Although a regional system is viewed as the environmentally preferred option, local economic constraints may dictate that another environmentally acceptable option be pursued.

In light of the concerns regarding costs and the protection of the cave resources, a phased approach for the Draft EIS is recommended which would ultimately result in either a regional system or a semi-regional system.

This approach involves the following 91<

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components:

1. Initiate Phase I of the project which would provide for design for upgrading the treatment facilities at Cave City and Horse Cave and for conveyance facilities to the Green River. The conveyance facilities would be evaluated with and without future flows from Park City and the proposed Mammoth Cave National Park Staging Area, and the Route 70 area.

2. The establishment of a critical decision date to coincide with completion of the preliminary design for Horse Cave and Cave City and for the National Park's decision regarding the development of the proposed Staging Area or the local communities' commitment to obtain additional non-EPA funding sources.

Point 3. Provide final design for facilities based on the above decisions. At that point, EPA and the Commonwealth of Kentucky will also have to define the extent of EPA eligibility for remaining design and construction.

If the NPS does develop the Staging Area and is able to provide funding assistance for Park City or if additional non-EPA funds are available, the remaining components of the regional alternative would then be constructed.

If the National Park Service does not develop the proposed Staging Area or if additional non-EPA funds are not available, the remaining components of a semi-

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regional alternative would be constructed.

The figure on Page 12 of your handout presents the preferred approach to wastewater management in the Mammoth Cave Area as recommended in the Draft EIS and briefly summarizes what I have just said.

In conjunction with the development of the EIS, a Citizen Review Committee was established to provide opportunities for interested groups, individuals, and governmental agencies to participate in the development of the EIS. Additionally to the Citizens Review Committee a Groundwater Technical Advisory Committee was established to provide data review and input into the groundwater studies that were being conducted during the development of the EIS.

The committees provided comments and ideas and suggestions during various stages of EIS. I would like to express my appreciation for the time and effort expended by committee members in reviewing the EIS materials, and providing comments and participating in meetings. The contribution of the committees was invaluable for the completion of the Draft EIS.

I might have lied to you. My comments might not have been brief but I had a captive audiance and I couldn't help myself. This concludes the presentation of the Draft EIS summary.

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I turn the meeting back over to Mr. Hagan.

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MR. HAGAN: Thank you, Ron. I would like to reiterate Ron's words about participation of local citizens and the committee activity. We started several years ago on what has turned out to be a very extensive public participation program in connection with our EIS activities, and we settled in on this committee structure as a preferred way to handling public participation. This kind of a meeting here is a rather cold and formal sort of an arrangement in which you listen to us and then you talk back to us but we don't really communicate, and the committee structure was designed to get a smaller group where it could be much less formal and much closer communication, and we do very sincerely appreciate the assistance of these folks, the time and effort these folks have put into this committee.

Now as you came into the hall right here behind you there was a table. I hope all of you registered. We would like this registration for several purposes. First of all, to justify our coming up here. I mean, I have to tell my boss, "Yes, there really was a public hearing up here, you know, and all these folks came." We would like to make sure you get on the mailing list to know what we are doing, if you are not on it already. But most important for tonight's activities I would like for any of you who wish to speak to fill out one of these cards and indicate that you want to speak.

94< At this time I have two yeses, one maybe, and

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two unmarked. So, without further ado I think we will get into the reason for our being here which is for us to listen to you. I will call on these folks in the order in which I received their cards and taking first those who said they definitely wish to speak. Now I will call on Mr. Leo Esters of Cave City City Council. Mr. Esters.

MR. LEO E. ESTERS: I am Leo Esters with the Cave City Council and I would like to express our opinion on it. We want on record as not opposing the 201 study right now but we want to kindly defer it until we can get some definite commitment from the National Park Service on this 201 study.

The way it started out everybody was suppose to be involved in it and right now it has got down to the point that only Cave City and Horse Cave are involved, and we feel like for the citizens of Cave City that the cost is prohibitive.

MR. HAGAN: Thank you, Mr. Esters. Dr. Jim Quinlan is the other gentleman that has indicated he wished to speak. Jim, would you come up to the microphone so we can all hear you. While Jim is coming up I will express publically to him my thanks for the 50 cent tour that we had this afternoon. It was very quick but it was very informative and we saw a lot of the surface features. I hope tomorrow morning to see some of the underground features that are of so much interest.

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DR. JIM QUINLAN: I just wanted to say that I saw nowhere in the plan or the supplementary volumns any discussion of monitoring the amount of flow through the pipes. We know from experience elsewhere in this area that sometimes the pipes which convey the sewage can leak, so they should be installed at reasonable intervals whether it is a one mile, five miles, what-have-you. That is not the point to be decided now, but at reasonable intervals there should be instrumentation installed to monitor the flow so between, shall we say, points 5 and 6 we can say, "Hey, half the flow is gone. We have got a leak there. Let's find it," and these should be monitored at a regular basis. That's all.

MR. HAGAN: I have a maybe here, Mr. Tom Chaney. Tom, have you decided whether you wish to speak or not.

MR. TOM CHANEY: Yeah, I will raise some questions.

MR. HAGAN: That's why we are here.

MR. TOM CHANEY: This started out -- way back when this thing started I was a very small boy.

MR. HAGAN: Yes, me too. (laughter in hearing room.)

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MR. TOM CHANEY: We got your grammar and style straightened out a little bit. I hope that spreads throughout the government. I have my doubts. I just want to register my chief concern and I am not a resident of the immediate area involved. I was invited to be on the committee and accepted that invitation. And, so, my concern is a little bit broader than maybe those representing specific areas, but my chief concerns are as follows:

I am concerned with the preservation of the unique underground system that we have in the area which includes groundwater as a viable resource.

I am also concerned related to that with the elimination of the odor in Horse Cave.

I am concerned that on Page A through 5 that 40 percent of the BOD stuff in Hidden River at Horse Cave is unaccounted for. I wonder what happens if we spend all this money and we still have the same problem.

I am concerned with the protection of the known and unknown cave environmental state within the parks and that the wastewater capacity in the region is sufficient to sustain the future tourist and industrial growth that will come to the area. And I don't know how -- I keep saying this over and over at the committee meetings and everything else, but we have got to have the help of the entire region and in a sense the entire country to preserve the resources that we are en-

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trusted with here, which means that Horse Cave and Cave City can't exclude Park City. Which means that all of us in the region -- and I speak as a dairy farmer and I have a suspicion that maybe I am a part of that 40 percent BOD problem in Hidden River Cave. I don't know that. I am, you know, doing my best to contribute to it. (laughter in hearing room.) And I want to urge the gentlemen of the National Park Service to accept its responsibility which starts as a user of any kind of regional system but which is broader than that which expands to the chief object of protection here or, at least, the center of protection in the area.

And I am concerned about all the alternatives that allow for groundwater discharge which flow through the Park and that are not taken care of.

And I am concerned by the apparent reluctance of the Park Service to jump in this with all four feet. Thank you.

MR. HAGGAN: We appreciate those comments and particularly the comment about the need for this particular region's undertaking. Whether you folks realize this or not, those of us who work for EPA, particularly way down there in Atlanta, do care about preserving the options of the Barren River Area Development District to solve their problems with the

98< assistance that the law has provided within the Clean Water

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Act, and we think that this is a regional problem and that was one of the big reasons for determining that this particular project should receive the detailed analysis it has through the EIS.

I have two other cards here which have no indication as to whether they wish to speak or not, Mr. Campbell Wallace. Campbell, would you like to say something for us?

MR. CAMPBELL Wallace: I feel like I should say something about the 201 but I will try to be -- just go through my documents here and be as brief as possible and then I will go through the re-wrote about two-page summary based on a little bit of the background.

One, there was a meeting back about the first of the year when we brought this down to where there were three alternatives which were viable. These were to be investigated further.

These were Horse Cave going seemingly to Green River with Cave City's local discharge. Local discharge into two towns and the two towns combined and going to the Green River as the first phase of a two-phase project.

The second phase was as shown in this handout to be the remaining items. The total cost as we developed it on the first phase is estimated at $3,612,000.00.

At the time this was written there was some

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idea of what the local individual share might be because the funds were readily available from the Farmer's Home Administration at a low interest rate. As of todate we can get the loan anywhere from 5 to 11 percent interest; and, so, the actual costs to individuals are a little bit up in the air. Based on this the first phase was approximately 43 cents per 1,000 for Cave City and 25 cents per 1,000 for Horse Cave. Now this was on the combined units, and the third phases was Mammoth Cave National Park. We assumed that the Staging Area, whereas inclined, was not constructing the improvements to their Green River plant estimated at $93,600.00.

Munfordville from a cost standpoint, it looked like they would go with the on-lot disposal and the plant upgrade was $76,800.00.

We estimated the entire Park City System and based it on a low pressure with a small line current with local disposal components, tertiary treatment, followed by land disposal and came up with $1,365,000.00 which brought this down to about a $7.00 minimum and about $1.86 per 1,000. This is all based on a 5 percent rate interest.

The Highway 70 area would pretty well have to be controlled on this basis and have to be controlled on-lot disposal facilities through a management association which we intend to make recommendations on this.

100< To make it as brief as possible, if anybody

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has any further questions? There appears to be with full participation by everyone on this. Very little difference in costs from the first stage regional approach and local approach. There is some at Cave City and it depends on the way the figures are developed. I do not feel there is a great deal of difference.

MR. HAGAN: Thank you, sir. The other gentleman who must have come in a little bit late is Mr. Charles Bryant. You didn't indicate whether you wish to speak but I would like to recognize you as being a member of the Cave City Council. I didn't get to recognize you the first time around. Where is Mr. Bryant? (A gentleman raises his hand.) Would you care --

MR. CHARLES Bryant: No, sir. I don't wish to.

MR. HAGAN: At this time I will open the floor to anyone who has not previously indicated a desire to speak. If there is anyone else that would wish to contribute to this record? (A gentleman indicates a desire to speak.) Yes, sir, would you come to the microphone and identify yourself for us, please, sir? (Two gentlemen start to microphone.) I am sorry, I will get to you next.

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MR. ROBERT DESKINS: Okay.

MR. TOM ALEY: I didn't see you. My name is Tom Aley. I have been involved --

MR. HAGAN: Would you spell that for the Court Reporter, please?

MR. TOM ALEY: A-l-e-y. I have been involved in this issue for the last couple of years on behalf of the City of Horse Cave and I appreciate their interest in it. I have also served on the Groundwater Technical Panel so I have had the opportunity of reviewing an awful lot of your data in detail.

I pride myself in being a practical person and it's that that brings me up in front of this. I think at this point in time with the reports that we have here that we have the solution to the problems in view and the money is available now and it may not be in the future. So, for the people who live in the area who have a lot to do with the decisions, I certainly hope that will be kept in mind. Thank you.

MR. HAGAN: Thank you, sir. Mr. Deskins. I am sure everybody in this area already knows Mr. Deskins. We haven't had the pleasure of meeting but Ron told me who you are.

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PENGAD CO., BAYONNE, N.J. 07002 · FORM 2RT

MR. ROBERT DESKINS: I feel like I probably should come before the group and I don't know that I need to defend the National Park Service for our position about the 201 today. I would like to say that the National Park Service still thinks the 201 and the regional system is the best system, but to respond to Tom's question about why we haven't jumped with all four feet to get in on this thing comesdown to the bottom line and that's money. And, quite frankly, if I had money in my budget I'd be more than willing to put it out and see that that money comes forth and see this project carried out.

I think all of us know and when I say "if we had the money," it is not the National Park Service money but it is your money, maybe coming through a different funding process. You know, it is just not available. The money is just not there. I would say this and I have worked desperately and I have made an attempt to see that if something is put in our program to possibly assist with such a project. Now I am willing to go on record and state here tonight that the National Park Service is willing to come forth and try to share our costs of this design for a phase that we may not be a part of, may not have an opportunity to be a part of.

I can't tell you here tonight that the Staging Area is going to be out one year or ten years from now. So far that is a project that has been on the drawing board for about 12 or 13 years and we are about where we were

PENGAD CO., BAYONNE, N.J. 07002 · FORM EBT

when we started several years ago. But, you know, the Park Service feels very dedicated to protecting the resources, the underground resources here and the Park, and even in the area, but whether or not we can come up with the money is another question. It is just unknown at this time but we do want to go on record and state that we would be willing to come forth with that phase or that part of the design that you are calling for in your alternatives. Thank you.

MR. HAGAN: Thank you. Is there anyone else who would like to make a statement.

MR. ROBERT DESKINS: Let me clear that statement there, the design money. I hope they don't expect the National Park Service to pay the entire tab, but I think we are willing to pay our fair share, maybe plus.

MR. HAGAN: I understood that. Thank you. Anyone else? (No one indicating a desire to speak.)

I wish to thank you all for your participation tonight. The comments that we received here tonight plus any other written comment which may come into our office between now and June 22nd will be fully evaluated. These comments will then be incorporated into the final Environmental Impact Statement and that final Environmental Impact Statement

PENGAD CO., BAYONNE, N.J. 07002 · FORM EBY

will indicate EPA's decision as to the project which we support.

I want to emphasize again that the ultimate decision in terms of what gets built on the ground is largely the responsibility of the BRADD.

The final Environmental Impact Statement will be filed with the Environmental Protection Agency's headquaters office. It will appear in the Federal Register and approximately 30 days after that date -- I know that none of you are anxious to read the Federal Register , I am neither, but 30 days after that date money will be then available for the phase two design for this project.

For those of you who have commented tonight and for those of you who have indicated on the registration card that you wish to get a copy of the final EIS, we will send that to you in the mail.

Again I would say the Comment Period is open until June the 22nd. My name and address is in the little blue handout which you have and if you wish to add any comments to the record, please feel free to do so.

Again I thank you for coming and good evening.

* * *

105<

PENGAD CO., BAYONNE, N.J. 07002 - FORM EBT

STATE OF KENTUCKY)
: SCT.
COUNTY OF WARREN)

I, Barbara B. Kilgus, Notary Public in and for the State of Kentucky at Large, do hereby certify that the foregoing Public Hearing regarding the Mammoth Cave Area 201 Facilities Plan, Environmental Impact Statement, was taken by me at the time, place, and for the purpose mentioned in the caption; that same was taken by me in shorthand notes and tape recording and thereafter transcribed by me on the typewriter; and the foregoing pages of typewritten matter contain a true, correct and complete copy of my said notes, to the best of my ability.

Given undermy hand this June 11, 1981.

Barbara B Kilgus
BARBARA B. KILGUS, NOTARY PUBLIC
State of Kentucky at Large

My commission expires: 4/26/82

PENGAD CO., BAYONNE, N.J. 07002 · FORM EST

106<

MAMMOTH CAVE AREA
201 FACILITIES PLAN

Environmental Impact Statement

DRAFT EIS

PUBLIC HEARING

JUNE 8, 1981

U.S. Environmental Protection Agency
Region IV
Atlanta, Georgia

107<

MAMMOTH CAVE AREA
DRAFT ENVIRONMENTAL IMPACT STATEMENT
201 FACILITIES PLAN

PUBLIC HEARING
June 8, 1981
7:30 P.M.

CAVE CITY CONVENTION CENTER

AGENDA

- Introduction and Purpose
- Summary of Draft EIS
  - Purpose
  - Background
  - Wastewater Alternatives
  - Preferred Alternative
- Comments From Elected Officials
- Comments From The Floor
- Adjourn

Written comments should be forwarded to:

John E. Hagan III, P.E.
Chief, EIS Branch
U.S. Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30365
404/881-7458

I. BACKGROUND

The Mammoth Cave Area Environmental Impact Statement is being prepared to address the provision of wastewater management facilities for a portion of the Mammoth Cave National Park and several communities proximal to the southeastern and eastern boundaries of the Park (See Figure 1). The EIS study area is situated in the Central Kentucky Karst which is characterized by a gently rolling terrain pitted with sinkholes. The subsurface contains a complex structure of limestone caves and free-flowing groundwaters. The area's geological features are recognized as unique national resources and provide the area with a strong tourist attraction at the National Park and other local commercial caves.

Due to the complexities of existing pollution problems in the cave area and the financial and apparent management constraints of the applicant cities, EPA made the decision to prepare an EIS in conjunction with the 201 Facilities Plan.

The EIS was initiated in October 1977. The focus of the study was on the development and evaluation of alternative wastewater management systems in the cave area and to ensure the integration of environmental and economic considerations at the earliest stage of facilities planning. The major issues that were identified included:

- the determination of subsurface water uses and water quality goals
- resolution of local groundwater pollution problems, and
- resolution of local funding responsibilities and capabilities.

During the EIS process, the issue areas were defined. The following issues were determined to be the most significant: (1) the sensitivity of the cave environment to wastewater discharges (2) resource value/importance of the caves (3) the complexity of the area's subsurface hydrology (4) financial impacts of wastewater management systems and funding options.

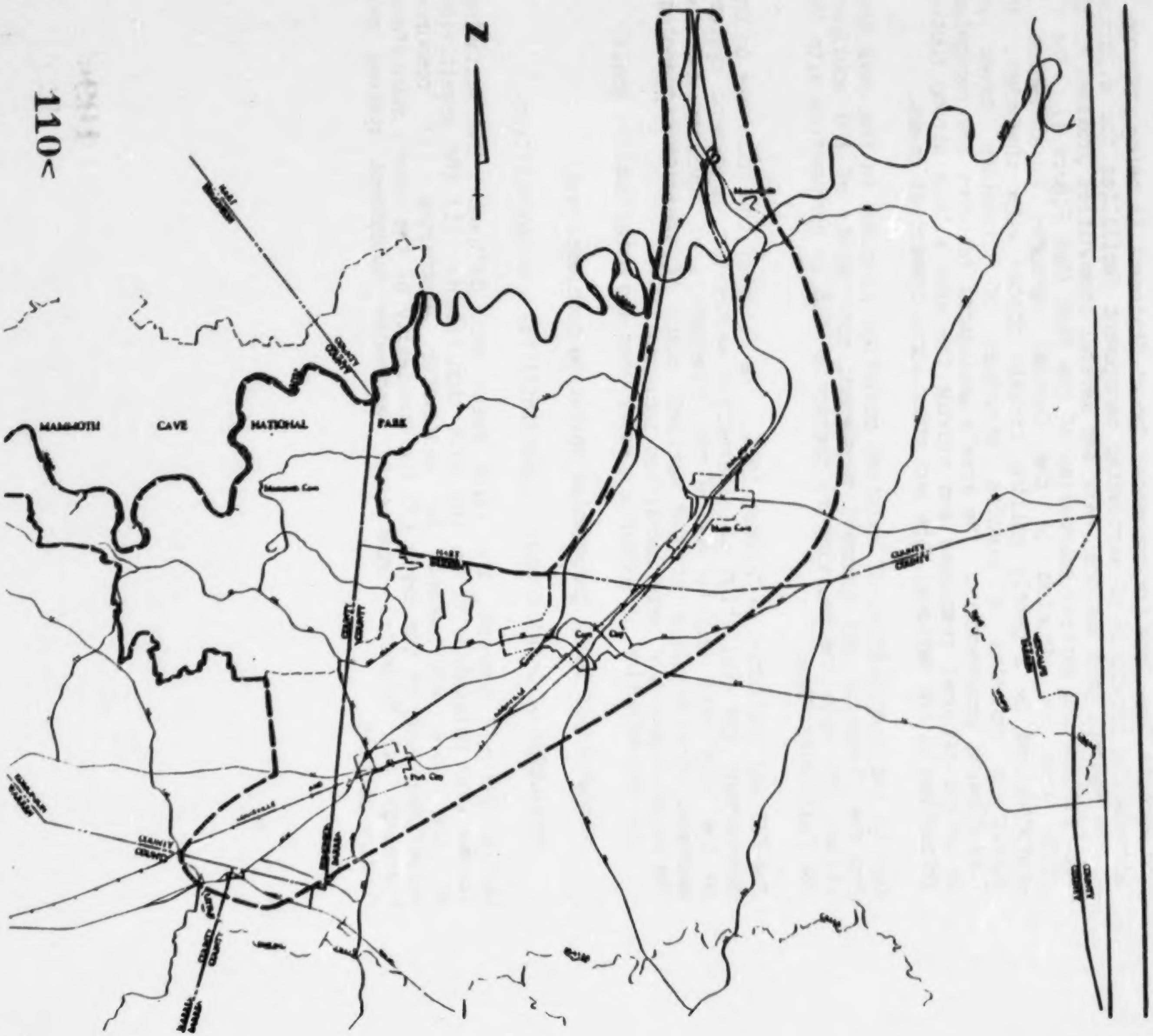
LEGEND
STUDY AREA LIMITS
N
MAMMOTH CAVE NATIONAL PARK
Mammoth Cave
HART
Cave City
Park City
12,000 6000 0 12,000 24,000
Scale in Feet

FIGURE I

MAMMOTH CAVE AREA
201 FACILITIES PLAN
ENVIRONMENTAL IMPACT STATEMENT

STUDY AREA

U.S. Environmental Protection Agency
Region IV Atlanta, Georgia

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II. ALTERNATIVES

A. Existing Wastewater Management

There are 5 major population centers in the study area. These include the municipalities of Munfordville (1975 population of 1,233), Horse Cave (1975 population of 2,068), Cave City (1975 population of 1,818), and Park City (1975 population of 576), and the proposed Staging Area at Mammoth Cave National Park. With the exception of Park City, these population centers maintain and operate wastewater treatment facilities. The disposal technique practiced by Munfordville and Mammoth Cave National Park is surface water discharge to the Green River. Treated effluent is disposed of in Horse Cave and Cave City, however, by direct discharge to adjacent sinkholes. Additionally, several privately owned treatment plants are located throughout the study area. Most of these small wastewater treatment plants have either a direct or indirect discharge to groundwater. Those areas not serviced by municipal or private treatment and disposal facilities, including Park City, employ on-lot treatment and sub-surface disposal techniques (including direct discharge to sinkholes).

B. Description of Alternatives

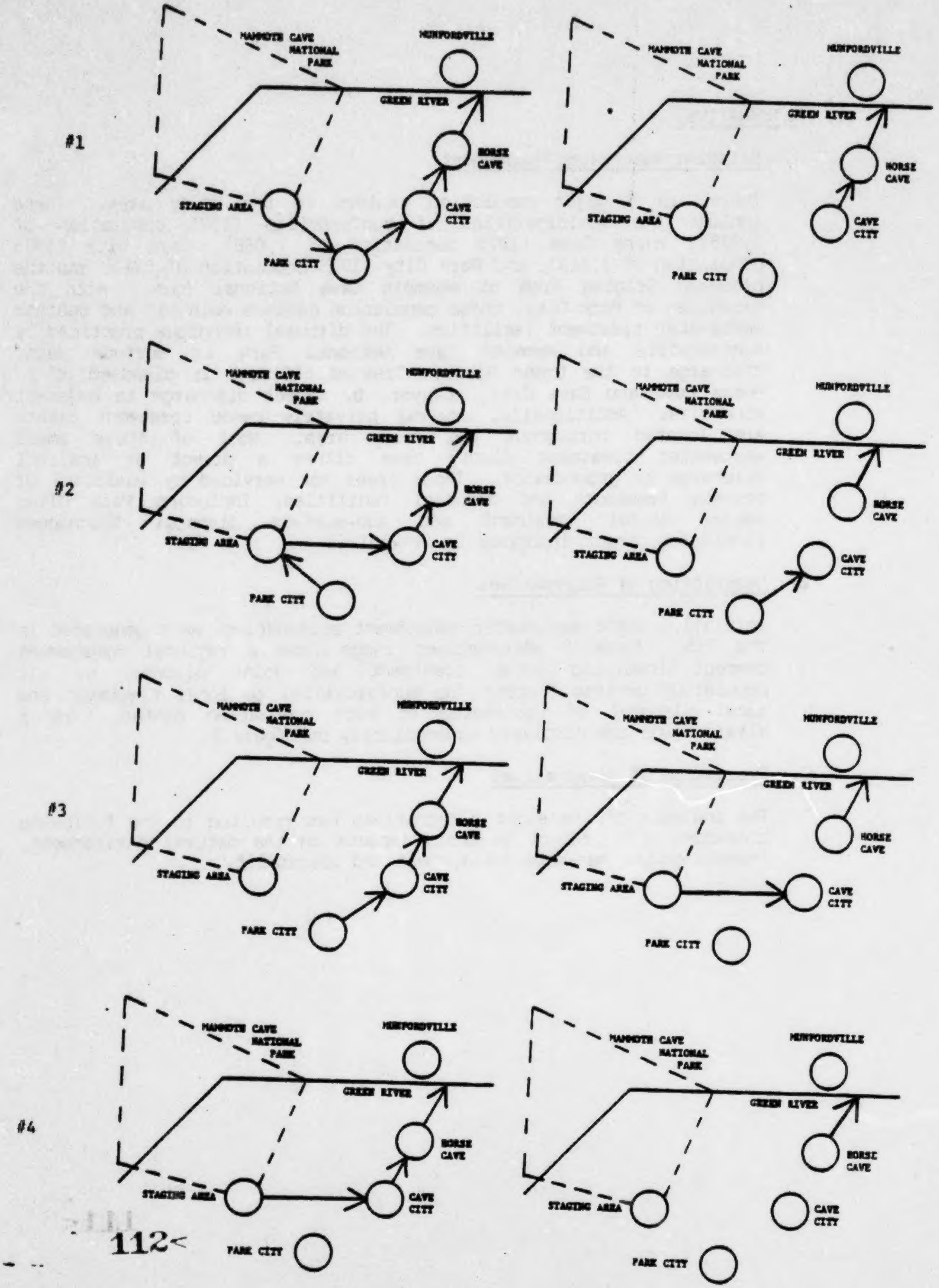
Initially, eight wastewater management alternatives were generated in the EIS. These 8 alternatives range from a regional management concept involving local treatment and joint disposal by all population centers (except for Munfordville) to local treatment and local disposal of wastewater at each population center. The 8 alternatives are displayed schematically on Figure 2.

C. Evaluation of Alternatives

The analysis of the eight alternatives has resulted in the following breakdown with respect to cost, impacts on the natural environment, impacts on the man-made environment and operability.

111<

Figure 2. MAMMOTH CAVE AREA EIS ALTERNATIVES


#1
MAMMOTH CAVE NATIONAL PARK
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
MAMMOTH CAVE NATIONAL PARK
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
#2
MAMMOTH CAVE NATIONAL PARK
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
MAMMOTH CAVE NATIONAL PARK
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
#3
MAMMOTH CAVE NATIONAL PARK
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
MAMMOTH CAVE NATIONAL PARK
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
#4
MAMMOTH CAVE NATIONAL PARK
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
MAMMOTH CAVE NATIONAL PARK
MUNFORDVILLE
GREEN RIVER
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY

Alternative	Estimated Net Present Worth (In Millions)	Impacts/ Natural Env.	Impacts/ Man-Made Env.	Operability
1	7 - ($10.9)	4	1	1
2	8 - ($11.6)	4	1	1
3	5 - ($9.9)	2	4	3
4	6 - ($10.3)	3	4	2
5	2 - ($8.0)	1	3	5
6	3 - ($9.6)	8	7	4
7	4 - ($9.7)	6	6	6
8	1 - ($7.6)	7	8	7

Of these 8 alternatives, 3 alternatives (numbers 2, 5, and 8) show the greatest promise. The cost of these alternatives have been refined and are presented below. Additionally, the pro/con discussion will be limited to these 3 options.

Alternative #	Project Cost	Annual O & M	Net Present Worth
2	$10,574,000	$261,000	$11,620,000
5	6,546,000	230,000	7,975,000
8	5,876,000	249,000	7,630,000

Of additional concern in the evaluation of alternatives is the estimated user costs of the alternatives, and the local implications of these costs. These costs for alternatives 2, 5, and 8 for three of the communities are presented below:

ESTIMATED ANNUAL USER COST
($/EQUIVALENT DWELLING UNITS)

Alternative #	Horse Cave*	Cave City**	Park City
2	$39	$68	$460***
5	40	79	155
8	44	71	150

* Does not include existing user cost of approximately $37/ EDU/year

** Does not include existing user cost of approximately $45/ EDU/year

*** Assumes 75% funding for conventional/collection systems, however, conventional collection systems are generally not funded

1. Alternative 2

(a) Description of Alternative 2:

This alternative involves the following components of a regional system:

(1) Local treatment facilities at each population center.

(2) Joint disposal of all effluent (except Munfordville) via surface water discharge (secondary treatment) to the Green River.

(3) Existing facilities at Cave City and Horse Cave would require upgrading.

(4) New facilities would be required at Park City and the Staging Area.

(5) Additional on-lot systems would be required at Munfordville.

(6) An inter-city conveyance and disposal line would be required.

(b) Pros of Alternative 2:

(1) Provides greatest amount of protection for free flowing groundwater, groundwater supplies, sensitive cave systems and rare and endangered species by removing all wastewater discharges from the subsurface water network.

(2) Corrects existing water quality problems in the Hidden River groundwater sub-basin.

(3) Corrects existing odor problems in Horse Cave.

(4) Exhibits greatest overall system operability (reliability, flexibility and maintainability).

(5) Has received the support of the communities, environmental/conservation groups and the National Park Service.

(6) Provides service to existing development along Route 70 (between the Park and Cave City) and affords protection of sensitive areas from wastewater discharges.

(7) Received a high rating with regard to natural and man-made environmental impact.

(c) Cons of Alternative 2:

(1) Has the highest net present worth cost.

(2) The cost to Park City would be prohibitive unless other funding sources could be tapped.

(3) The potential exists for development to be encouraged along Route 70. In this instance, non-point source problems could adversely impact area cave systems.

(4) There is currently no multi- city or county sewer authority to implement this option. Local communities are, however, in the process of developing one.

(5) Considerable construction activity is associated with the inter-city conveyance and disposal line (114,000 feet of gravity lines and force mains).

2. Alternative 5

(a) Description of Alternative 5:

This alternative involves the following components:

(1) Local treatment facilities at each population center.

(2) Joint disposal of Horse Cave's and Cave City's effluent via surface water discharge (secondary treatment) to the Green River.

(3) Existing facilities at Horse Cave and Cave City would require upgrading.

(4) Additional conventional and alternative on-lot systems would be required at Park City.

(5) Additional on-lot systems would be required at Munfordville.

(6) The Park's proposed Staging Area would employ on-lot systems.

(b) Pros of Alternative 5:

(1) Has the next to lowest net present worth cost.

(2) Corrects the obvious water quality and odor problems in the Hidden River groundwater sub-basin by removing Horse Cave's and Cave City's sub-surface discharges.

(3) As with #2, provides the greatest degree of protection of the groundwater system and cave environment for the Hidden River sub-basin.

(4) Involves less than half of alternative 2's construction activity for the inter-city conveyance system (approximately 51,000 feet of gravity lines and force mains).

(5) When compared to #2, the local cost is significantly less for Park City, slightly more for Cave City and the same for Horse Cave.

(6) If the force mains from Cave City to Horse Cave to the Green River were designed to include flows from the Staging Area and Park City, this alternative could be the initial phase of what could eventually be a regional system to include Park City and the Park Service.

(c) Cons of Alternative 5:

(1) Existing residential and commercial developments now using on-lot systems in Park City and along Route 70 would not be served. According to the Park Service's dye tracing studies these areas are drained by groundwater basins that flow through the Park. Although no problems have yet been detected, the potential does exist for the continued use of these on-lot systems to adversely impact these sensitive areas and the proposed critical habitat of the Kentucky Cave Shrimp within the boundaries of the Park.

(2) The local cost to Cave City is slightly higher than #2.

(3) System operability (reliability, flexibility and maintainability) is less than #2.

(4) Although this alternative does address the water quality problems in Horse Cave and Cave City, it does not receive the support of the Park Service and other interests as does #2 because all sub-surface wastewater discharges are not removed.

3. Alternative 8

(a) Description of Alternative 8:

This alternative involves the following components:

(1) Local treatment facilities at each population center.

(2) Additional conventional and alternative on-lot systems at Park City.

(3) On-lot systems at the Park's proposed Staging Area.

(4) Cave City's existing facility would require upgrading for sub-surface discharge (advanced secondary treatment).

(5) Horse Cave's existing facility would require upgrading for surface water discharge (secondary treatment) to the Green River.

(6) Additional on-lot systems would be required at Munfordville.

(b) Pros of Alternative 8:

(1) Has the lowest net present worth cost.

(2) Lowest local costs for Cave City and same local cost for Park City as in Alternative 5.

(3) Removes Horse Cave's discharge from the Hidden River Sub-basin.

(4) Least amount of construction activity for inter-city conveyance and disposal system (approximately 36,000 feet of gravity lines and force mains).

(c) Cons of Alternative 8:

(1) Existing residential and commercial developments now using on-lot systems in Park City and along Route 70 would not be served. According to the Park Service's dye tracing studies, these areas are drained by groundwater basins that flow through the Park. Although no problems have yet been detected, the potential does exist for the continued use of these on-lot systems to adversely impact these sensitive areas and the proposed critical habitat of the Kentucky Cave Shrimp within the boundaries of the Park.

(2) Cave City's sub-surface discharge would not be removed. The potential for the Hidden River sub-basin to be adversely impacted by wastewater discharges does exist.

(3) This option is rated lowest concerning impacts to the natural and man-made environment.

(4) This option is rated lowest concerning system operability (flexibility, reliability, and maintainability).

(5) This option has received the least amount of support from the Park Service, the communities and interested groups and individuals.

(6) Although wasteload allocations for sub-surface discharges have been developed, a lesser degree of confidence is attached to these allocations than to surface water discharges.

(7) This option would preclude the possibility of Park City or the Park Service being served by a regional system.

III. DRAFT EIS PREFERRED ALTERNATIVE

The underlying theme of the EIS is that the provision of wastewater services should be compatible with efforts to preserve and protect this areas's nationally significant cave systems and their unique physical, biological and historical resources. The local EIS review committee and the National Park Service (NPS) have voiced their support for a regional wastewater management system that would afford the greatest protection of the area's groundwater and sub-surface systems. Although a regional system is viewed as the environmentally preferred option, local economic constraints may dictate that another environmentally acceptable option be pursued.

In light of the concerns regarding cost and the protection of the cave resources, a phased approach is recommended which will ultimately result in a regional (Alternative 2) or semi-regional (Alternative 5) wastewater management system.

This approach involves the following components:

1. Initiate Phase I of the project which would provide for design for upgrading the treatment facilities at Cave City (0.37 MGD) and Horse Cave (0.53 MGD) and for conveyance facilities to the Green River. The conveyance facilities would be evaluated with and without future flows from Park City (0.08 MGD), the proposed Mammoth Cave National Park Staging Area (0.105 MGD), and the Route 70 area.

2. The establishment of a critical decision date to coincide with completion of the preliminary design for Horse Cave and Cave City for the NPS's decision regarding the development of the proposed Staging Area or the local communities' commitment to obtain additional non-EPA funding sources.

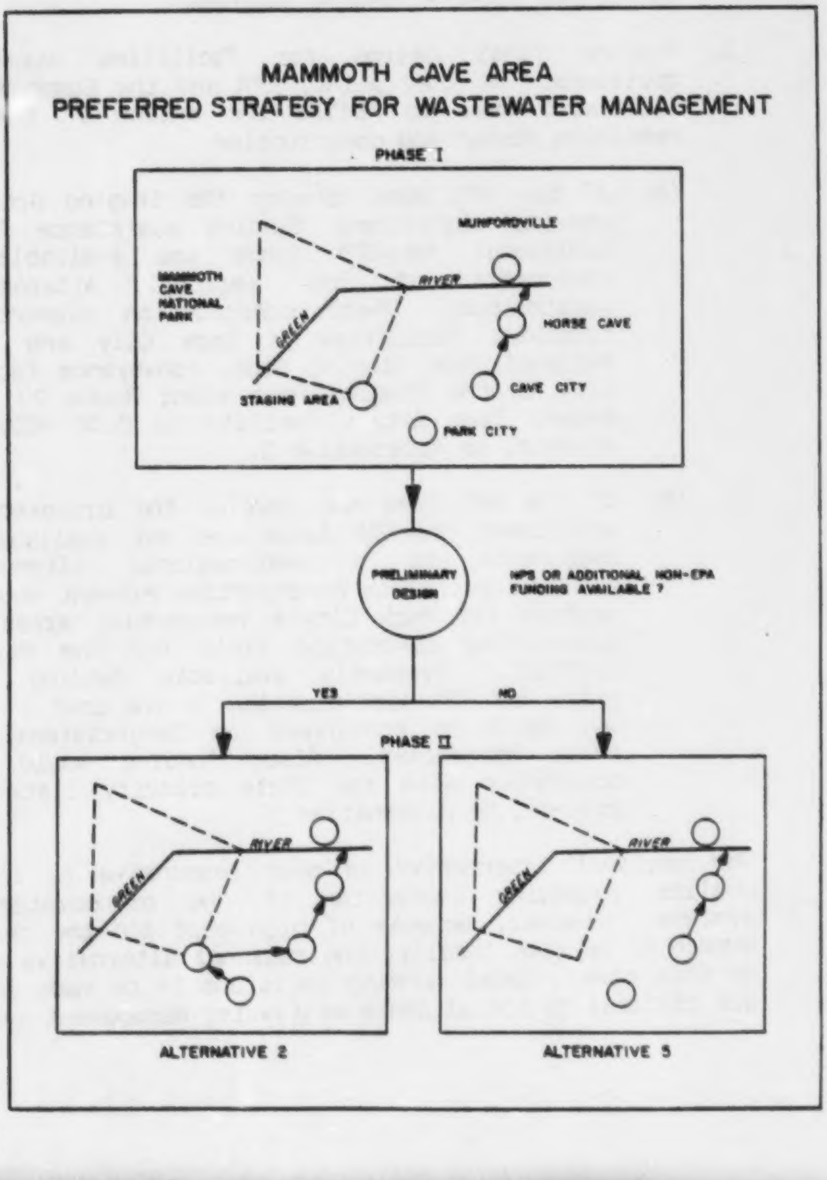
3. Provide final design for facilities based on the above decisions. At that point, EPA and the Commonwealth of Kentucky will also have to define the extent of EPA eligibility for remaining design and construction.

   (a) If the NPS does develop the Staging Area and is able to provide significant funding assistance for Park City or additional non-EPA funds are available, the remaining components of the regional alternative could be constructed. These construction elements would involve treatment facilities at Park City and the Mammoth Cave National Park Staging Area, conveyance facilities from Park City to the Staging Area along Route 70 to Cave City and expand Cave City's facility to 0.58 MGD. This would, in essence, be Alternative 2.

   (b) If the NPS does not develop the proposed Staging Area or additional non-EPA funds are not available, the remaining components of a semi-regional alternative would be constructed. This construction element would involve on-lot systems for Park City's residential areas and a community sub-surface absorption field for the Park City business district. Presently available funding mechanisms would allow for EPA participation in the cost of these activities but would be contingent on Congressional continuation of these mechanisms. Also, funding would have to be in accordance with the State priority list. This would, in essence, be Alternative 5.

The regional alternative is most responsive to local and the NPS desires regarding protection of the groundwater and the cave systems. However, because of high cost and the resultant financial burden to be seen locally, the regional alternative may not be viable at this time. Local funding decisions to be made in the near future are critical to the ultimate wastewater management system for this area. Additional non-EPA funds must be available for a regional system to be affordable to Park City. Until the appropriate decisions related to NPS funding or other non-EPA financial assistance are made, EPA is moving to resolve existing wastewater management and water quality problems. In essence, the proposed phased approach would allow for resolving the current more serious problems while remaining flexibile to future local funding decisions.

The following figure presents the preferred approach to wastewater management in the Mammoth Cave study area, as recommended in the Draft EIS.


MAMMOTH CAVE AREA
PREFERRED STRATEGY FOR WASTEWATER MANAGEMENT
PHASE I
MUNFORDVILLE
MAMMOTH CAVE NATIONAL PARK
RIVER
GREEN
HORSE CAVE
CAVE CITY
STAGING AREA
PARK CITY
PRELIMINARY DESIGN
NPS OR ADDITIONAL NON-EPA FUNDING AVAILABLE ?
YES
NO
PHASE II
RIVER
GREEN
RIVER
GREEN
ALTERNATIVE 2
ALTERNATIVE 5

VII. COMMENTS RECEIVED ON THE DRAFT EIS

This section includes all those letters received from persons commenting on the Draft EIS. These persons or agencies are listed in Section V., Part A of this document.

OHIO RIVER BASIN COMMISSION
Suite 208-20 36 East Fourth Street
Cincinnati, Ohio 45202 513/684-3831 (FTS)

May 5, 1981

Mr. John E. Hagan III, P.E.
Chief, EIS Branch
EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Hagan:

This is in response to your letter of April 30, 1981 requesting comments of the Ohio River Basin Commission on the draft environmental impact statement (EIS) and 201 Facilities Plan for the Mammoth Cave Area, Kentucky.

The draft environmental impact statement appears to have been properly coordinated with the appropriate Commission members.

The Ohio River Basin Commission staff has examined the draft EIS and finds that it is consistent with the Commission's Comprehensive Coordinated Joint Plan (CCJP) as it exists today.

Should you have any questions, please contact Edward Hood at the address or telephone number above.

FOR THE OHIO RIVER BASIN COMMISSION:

for
Frank Kudrna
Vice-Chairman

cc:

Kentucky: Jackie Swigart
Thomas L. Grissom
USEPA: Ofc. of Fed. Rel. (3 copies)

Henry S. Fritz, Jr.
Hopkinsville, Ky. 1st District

Joseph Fey Britt
Madisonville, Ky. 2nd District

Jack T. Brooks
Louisville, Ky. 3rd District

Dr. James C. Salato
Columbia, Ky. 4th District

Dr. James R. Rich
Covington, Ky. 5th District

Charles Palmer
Lexington, Ky. 6th District

Tim Dosh
Jenkins, Ky. 7th District

Dr. Robert C. Webb
Grayson Ky. 8th District

Danny K. Coffey
Jamestown Ky. 9th District

DEPARTMENT OF FISH AND WILDLIFE RESOURCES
ARNOLD L. MITCHELL BLDG.
#1 GAME FARM ROAD
FRANKFORT, KENTUCKY 40601
CARL E. KAYS
COMMISSIONER

RECEIVED

DEPT. NATURAL RES. & ENV. PROT.
POLICY & PROGRAM ANALYSIS

May 18, 1981

Mr. James L. Hummeldorf, Administrator
Office of Special Projects
Department for Natural Resources
& Environmental Protection
Capital Plaza Tower, Fourth Floor
Frankfort, KY 40601

Re: Draft Environmental Impact Statement,
Mammoth Cave Area, Kentucky.

Dear Mr. Hummeldorf:

Members of my staff have reviewed the above-referenced Draft Environmental Impact Statement (DEIS). Accordingly, we offer the following comments.

This Department endorses the objectives of the DEIS and supports the preferred alternative. We realize that alternative 2 will present a greater financial burden, but the protection that it will afford the cave ecosystem of the Mammoth Cave area is immeasurable in monetary values.

Due to the delicate nature of cave ecosystems, occurrences of rare organisms in the area, and the severity of the problem, we feel that implementation of this program will be highly beneficial to the human and wildlife resources in the Mammoth Cave area.

Thank you for the opportunity to comment.

Sincerely,

Carl E. Kays
Commissioner

CEK:WLD:bp

123<

copies: Bob Bay, USFWS
Al Lucas, USEPA
Environmental Section Files

UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY 40506

COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF ANTHROPOLOGY

June 3, 1981

Environmental Review
Office of Special Projects
Department for Natural Resources
and Environmental Protection
4th Floor, Capital Plaza Tower
Frankfort, Kentucky 40601

Re: Environmental Impact Statement (Draft), Mammoth Cave Area, Kentucky.

Gentlemen:

A review of the archaeological site files maintained by this office revealed that there are 23 previously recorded sites within the Mammoth Cave plan area. The majority of these sites were reported during an archaeological survey of the park conducted by the National Park Service. Undoubtedly, there are additional sites outside of the park boundary but within this plan area which have not been reported. We agree with the comment provided by the Kentucky Heritage Commission (p. III-116) that an archaeological survey be conducted prior to any construction activities. In addition, should any archaeological materials such as chipped-stone tools, pottery or bone be uncovered during construction, then the Office of State Archaeology should be notified immediately so that appropriate action can be taken.

If you have any questions regarding this response, please don't hesitate to contact us.

Sincerely,

Robert L. Brooks
Office of State Archaeology

RECEIVED
JUN 8 1981
DEPT. NATURAL RES. & ENV. PROT.
POLICY & PROGRAM ANALYSIS

124<

SIERRA CLUB

CUMBERLAND CHAPTER

P.O. Box 468
Versailles, Kentucky 40383
June 4, 1981

Mr. John E. Hagan II
EIS Branch
EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Hagan:

The following comments are submitted on behalf of the Kentucky Chapter of the Sierra Club in regards to the Draft Environmental Impact Statement (DEIS) for the Mammoth Cave Area 201 Facilities Plan.

The Sierra Club has reviewed the plan and its range of alternatives and does hereby voice its support for alternative #2. This alternative is the only one that attempts to deal with the problem of waste water control in a comprehensive manner. The area along highway 70, the site of much of the existing development, and the likely location of future growth would be served. Additionally, the wastewater of all known major polluters would be controlled.

Thank you for this opportunity to comment on the Draft EIS. We look forward to the development of the final EIS and the eventual mitigation of a problem that threatens the future of one of the most significant karst regions in the world.

Sincerely,

William L. Schneider

William L. Schneider
Conservation Chairman, Sierra Club

cc Hank Graddy

"When we try to pick out anything by itself, we find it hitched to everything else in the universe."

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta, Georgia 30333
(404) 262-6649

June 8, 1981

John E. Hagan III, P.E.
Chief, EIS Branch
Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Hagan:

We have reviewed the Draft Environmental Impact Statement on the Mammoth Cave Area, Kentucky. We are responding on behalf of the Public Health Service.

From our review of this document, it appears that a wastewater management system that is compatible with the cave's sensitive natural resources and can be supported by the local economy is the main issue.

We did not find any mention of present or past public health implications from the contaminated sub-surface waters. However, we are supportive of any efforts to eliminate untreated discharges to sub-surface water resources and the environment.

Thank you for the opportunity to review this statement. We would appreciate receiving a copy of the final document when it is issued.

Sincerely yours,

Frank S Lisella

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

Kentucky Heritage Commission
104 Bridge Street
Frankfort, Kentucky 40601

MEMORANDUM

TO: Environmental Review
Office of Special Projects

FROM: (Mrs.) Anne Armstrong Thompson aaT
Executive Director

DATE: June 8, 1981

SUBJECT: Draft Environmental Impact Statement;
Mammoth Cave Area, Kentucky

The Kentucky Heritage Commission has reviewed the Draft Environmental Impact Statement for the Mammoth Cave Area, Kentucky. Our review of the statement indicates that the applicant is in compliance with the Advisory Council's Regulations for the Protection of Historic and Cultural Properties (36 CFR, Part 800) pursuant to the National Historic Preservation Act of 1966, National Environmental Policy Act of 1969 and Executive Order 11593.

pm

attachment

RECEIVED
JUN 9 1981
DEPT. NATURAL RES. & ENV. PROT.
POLICY & PROGRAM ANALYSIS

DEPARTMENT OF THE ARMY
LOUISVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 59
LOUISVILLE KENTUCKY 40201

JUN 9 1981

ORLPD-R

Mr. John E. Hagan, III, P.E.
Chief, EIS Branch
EPA, Region 4
345 Courtland Street, N.E.
Atlanta, GA 30365

Dear Mr. Hagan:

Thank you for the opportunity to comment on the draft Environmental Impact Statement concerning proposed construction of wastewater facilities in the Mammoth Cave Area, Kentucky. We would like to submit the following comments:

A. Page IV

1. Item 1e. Define "on-lot systems" and the number of systems to be utilized. Additional "on-lot systems" may contribute to further problems. If so, add to subsections 3, Page V.

2. Item 2. Change "Pros" to advantages here and throughout the document.

B. Page V

1. Item 3. Change "cons" to "disadvantages" here and throughout the document.

2. Items 1d and 1e. Differentiate between "conventional and alternative on-lot" and "on-let" in 1d and 1e, if applicable, here and throughout the document.

C. Page VI

1. Item 2f. Delete "what could eventually be" since this is speculative.

2. Item 3a. Reword sentence 3 to read, "Although no problems have yet been detected, continued use of these on-lot systems has the potential to adversely impact these sensitive areas . . . . "

128<

3. Item 3a. The wording, "proposed critical habitat," is unclear and not mentioned elsewhere in the document.

4. Item 3d. Define "other interest."

D. Page VII

1. Item 1d. Change "for subsurface discharge advanced secondary treatment" to read "advanced secondary treatment for subsurface discharge."

2. Item 3a. Add "by a collection system" to the first sentence. Also same comments for "proposed critical habitat" as found in item 3a, page VI.

E. Page II-3, third line from bottom. Change "cost-effective" to "cost-effectiveness."

F. Page II-34.

1. Correct redundant phrase in first full block (Alternative 2). Suggest deletion of "conveyance of Park City treatment plant."

2. Second full block. Treatment of staging area and Park City flows a second time at Cave City appears unnecessary. Please explain.

G. Page II-46. The page does not adequately summarize alternative (SA-PC-CC-HC)$_2$ as to conveyance sequence and treatment sequence. (Refer to Pages II-31, bottom and II-32, top).

H. Figure II-3.

1. Line sizes should be given.

2. Park City force main should originate from the new pump station, not from the treatment plant.

3. The conveyance line from Park City should terminate into new Cave City pumping station, not the treatment plant.

I. Figure II-4.

1. Show "Chaumont" on figure.

2. Force main from Park City should terminate at new pumping station at Chaumont, not at the STP.

3. Show "Toohey Ridge" on figure.

4. According to block 3, Page II-34, the staging area, Park City and Cave City flows are treated in the upgraded Cave City STP, therefore, the line from the staging area terminates at STP rather than at the pump station, as shown.

J. Figure II-5. According to block 1, page II-37, combined Park City and Cave City flow is pumped to Horse Cave Pumping Station, not the treatment plant, as shown. Other figures may need correction for the same reasons given for Figures II-3, II-4, and II-5.

K. Figure III-5. Noting the numerous point sources shown on this figure, it can be concluded that not enough is mentioned in the document about the fate of all existing point sources in the plans or selected plan area; in other words, which sources are phased out, which remain operating, etc.

L. Page III-66. Under "Small Wastewater Treatment Plants," the statements and conclusions made in this section are based on supposition and are not valid in the absence of data. At minimum, data should be obtained for the treatment plants which discharge directly or indirectly to the ground water to determine conclusively whether this total flow (34,900 gpd) has potential to adversely impact the ground water in this sensitive area.

M. Section 10 of the Rivers and Harbors Act of 1899 requires that any work to be done on a "navigable water of the United States" be authorized by a Department of the Army (DA) permit. The proposed outfall site is above our Section 10 jurisdiction on the Green River and, therefore, will not require a DA permit under this section of the law.

N. The Green River, at the proposed outfall site, has an average annual flow exceeding five cubic feet per second. Therefore, any placement of dredged or fill material below the Ordinary High Water (OHW) elevation will require authorization under Section 404 of the Clean Water Act.

O. Backfill for utility line crossings is already authorized under the provisions of 33 CFR 323.4-3(a)(1) of our regulations as published in the Federal Register, Volume 42, No. 138, on 19 July 1977. Therefore, an individual DA permit will not be required if the streambed is returned to preconstruction contours, excess excavation material is removed to a contained upland disposal area and there is compliance to the attached special conditions.

P. According to the DEIS, cofferdam construction for the outfall system would involve the building of a dirt peninsula into the river. If the selected plan includes the cofferdam construction, an individual DA permit application must be made and received before work can commence. Any questions on permit matters should be directed to the above address, ATTN: Regulatory Functions Branch, ORLOP-FS, or by calling (502) 582-5452.

Q. Munfordville is the only city of the four Mammoth Cave Area cities participating in the National Flood Insurance Program and is currently in the emergency phase. Being in this phase, special flood hazard areas have been delineated for Munfordville and certain controls are administered by the city to reduce or prevent flood damage in these areas.

R. Any construction should be carefully evaluated to insure that flood damages that could be incurred by the proposed facilities are prevented or reduced. This would applicable to such damages to other existing structures that could be caused by the proposed facilities. Construction should be evaluated to insure compliance with Executive Order 11988, Flood Plain Management. In essence, the Executive Order directs federal agencies to use practicable alternatives to construction in the 100-year flood plain, if available, and, if not, take measures to minimize the impacts of such construction.

We are inclosing a marked-up copy of the subject DEIS to enable you to more easily note our comments, especially b through m.

Sincerely,

C. E. Eastburn

2 Incl
As stated

C. E. EASTBURN
Colonel, Corps of Engineers
District Engineer

JUN 8 1981

SPECIAL CONDITIONS

SECTION NO.	ACTIVITY
323.4-3(a)(1)	Dredged or fill material placed as backfill or bedding for utility line crossings.
323.4-3(a)(2)	Bank stabilization material, 500 feet in length, average 1 cubic yard/running foot.
323.4-3(a)(3)	Minor road crossing fills.
323.4-3(a)(4)	Fill placed with bridges.
323.4-3(a)(5)	Repair or replacement of previously authorized fill.

1. That the discharge will not be located in the proximity of a public water supply intake;

2. That the discharge will not occur in areas of concentrated shellfish production;

3. That the discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species;

4. That the discharge will not disrupt the movement of those species of aquatic life indigenous to the waterbody;

5. That the discharge will consist of suitable material free from toxic pollutants in other than trace quantities;

6. That the fill created by the discharge will be properly maintained to prevent erosion and other non-point sources of pollution; and

7. That the discharge will not occur in a component of the National Wild and Scenic River System or in a component of a State Wild and Scenic River System.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
PLATEAU BUILDING, ROOM A-5
50 SOUTH FRENCH BROAD AVENUE
ASHEVILLE, NORTH CAROLINA 28801

June 11, 1981

Ms. Rebecca Hanmer
Regional Administrator
Environmental Protection Agency
345 Courtland Street, NE
Atlanta, GA 30308

Re: 4-2-81-051

Dear Ms. Hanmer:

This letter is intended as an endangered species Section 7 review of the EIS for Mammoth Cave area Kentucky, as concerns proposed wastewater facilities. This letter does not constitute a review of all Fish and Wildlife Service concerns. These will be addressed by the Office of Environmental Project Review in separate correspondence pursuant to the Fish and Wildlife Coordination Act.

On June 3, 1981, Richard Biggins of my staff spoke by phone with Ronald Mikulak of your office concerning using the endangered species section of your EIS as a biological assessment. As the document presently stands, the endangered species sections of the EIS are inadequate as they relate to the Endangered Species Act's requirement for a biological assessment. While literature review, contact with recognized experts, and knowledge of the Mammoth Cave area and its habitats have reduced the species potentially present to five species (three endangered mussels, the proposed cave shrimp, and one plant currently under status review), the biological assessment requirements have not been fulfilled for the three mussels. A conclusion of no jeopardy to the cave shrimp from the proposal would seem in order based upon the information presented and the plant incurs no legal requirements at this time.

Our January 12, 1981, letter to Claude Terry and Associates, Inc. (copy enclosed) outlined what we felt were the minimum requirements of a biological assessment. It included the following language:

1. Identification of the listed species, species proposed for listing and Critical Habitat determined to be present within the area affected by the proposal.

2. Description of the survey methods used to determine presence of listed species or species proposed for listing within the area.

3. The results of a comprehensive survey of the area.

4. Description of any difficulties encountered in obtaining data and completing proposed studies.

5. Description of the proposed construction project and associated activities.

6. Description of methods and results of studies made to determine the actual and potential impacts of project or associated activities on listed species, species proposed for listing, or Critical Habitat. In addition to the direct (site related) impacts of project construction the biological assessments should include, when applicable, descriptions of:

   A. Impacts associated with project operation.

   B. Secondary impacts from activities, such as development, which will be generated by the proposed project.

   C. The cumulative effects of the proposal on the species and/or its Critical Habitat. Cumulative effects are defined as the direct and indirect impacts of the Federal action under consideration coupled with the identifiable effects of other reasonably foreseeable actions of the Federal agency; other Federal, State, and local agencies; corporations; and individuals upon a species or its Critical Habitat.

7. Where impacts to listed species, species proposed for listing, or Critical Habitat are identified, the assessment should include a discussion of the efforts that will be taken to eliminate, reduce, or mitigate any adverse effects.

8. Conclusions of the agency including recommendations regarding further studies.

9. Any other relevant information.

The major deficiencies in the EIS as it relates to the Endangered Species Act requirements concern the need for:

1. Survey data on the extent of mussel populations, expecially at site of diffuser system.

2. Secondary impacts.

3. Cumulative effects.

4. Efforts that will be taken to eliminate, reduce, or mitigate any adverse effects.

As discussed within the June 3, 1981, phone conversation between our staffs, the biological assessment does not need to be incorporated into the EIS. Therefore, the collection of data for above concerns could be delayed. This delay is allowable under the Act as long as there are no irreversible or irretrievable commitment of resources which would deny the formulation or implementation of reasonable alternatives regarding your actions on any endangered or threatened species. You should, however, reference in the EIS that a biological assessment will be conducted and Section 7 formal consultation initiated if any affect on endangered species are anticipated.

Thank you for your interest in endangered species. If this office can be of further assistance, please contact Gary Henry, Robert Currie, or Nora Murdock at FTS 672-0321, commercial 704/258-2850, ext. 321.

Sincerely yours,

Bob Pacific

Robert D. Pacific
Acting Area Manager

SURNAME

January 12, 1981

Mr. Robert J. Hunter
[illegible] Biologist
[illegible] Associates, Inc.
[illegible] Valleyway, NE
[illegible]

Re: 4-2-81-057

Dear Mr. Hunter:

This is in response to your letter of December 31, 1980, received January [illegible] 1981, requesting a list of endangered and threatened species within the [illegible] area of the 201 wastewater facility plan for Sewanee, Franklin County, Tennessee.

We have reviewed the distributional records in our files and believe that the following species may be present within the impact area of this [illegible]:

1. Indiana bat (*Myotis sodalis*) - E*(endangered)
2. Gray bat (*Myotis grisescens*) - E
3. Fine-rayed pigtoe pearly mussel (*Fusconaia cuneolus*) - E
4. Shiny pigtoe pearly mussel (*Fusconaia edgariana*) - E
5. Cumberland monkey-face pearly mussel (*Quadrula intermedia*) - E
6. Pale lilliput pearly mussel (*Toxolasma cylindrella*) - E
7. Turgid-blossom pearly mussel (*Epioblasma turgidula*) - E
8. Yellow-blossom pearly mussel (*Epioblasma florentina florentina*) - E
9. Painted snake coiled forest snail (*Anguispira picta*) - threatened
10. Verrucose river snail (*Io verrucosa verrucosa*) - FPE
11. Elk River file snail (*Io verrucosa lima*) - FPT (formerly proposed for listing as a threatened species)

12. Umbilicate river snail (*Leptoxis subglobosa umbilicata*) - FPT

13. *Dalea foliosa* - FPE

14. *Silphium brachiatum* - FPE

15. *Saxifraga careyana* - SI-T (on the Smithsonian Institution's list of threatened plants)

16. *Platanthera integra* - SI-T

Section 7(c) of the Endangered Species Act of 1973, as amended in 1978, requires Federal agencies such as the Environmental Protection Agency (EPA), to provide a biological assessment for the listed species and/or the species proposed for listing which are likely to be affected. The biological assessment shall be completed within 180 days after the date on which initiated, or within a mutually agreed upon time frame, before any contracts for construction are entered into, and before construction is begun. We do not feel that we can adequately assess the effects of the proposed action on listed species, species proposed for listing or Critical Habitat without a complete assessment. At a minimum the following information is requested

1. Identification of the listed species, species proposed for listing and Critical Habitat determined to be present within the area affected by the proposal.

2. Description of the survey methods used to determine presence of listed species or species proposed for listing within the area.

3. The results of a comprehensive survey of the area.

4. Description of any difficulties encountered in obtaining data and completing proposed studies.

5. Description of the proposed construction project and associated activities.

6. Description of methods and results of studies made to determine the actual and potential impacts of project or associated activities on listed species, species proposed for listing, or Critical Habitat. In addition to the direct (site related) impacts of project construction the biological assessments should include, when applicable, descriptions of:

   A. Impacts associated with project operation.

   B. Secondary impacts from activities, such as development, which will be generated by the proposed project.

   C. The cumulative effects of the proposal on the species and/or its Critical Habitat. Cumulative effects are defined as the direct and indirect impacts of the Federal action under consideration coupled with the identifiable effects of other reasonably foreseeable actions of the Federal agency, other Federal, State, and local agencies, corporations, and individuals upon a species or its Critical Habitat.

7. Where impacts to listed species, species proposed for listing, or Critical Habitat are identified, the assessment should include a discussion of the efforts that will be taken to eliminate, reduce or mitigate any adverse effects.

8. Conclusions of the agency including recommendations regarding further studies.

9. Any other relevant information.

Should you require additional information on this subject, please contact Mr. Gary Henry, Mr. Robert Currie, or Ms. Nora Murdock in the Asheville Area Office, FTS 672-0321, commercial 704/25[illegible], ext. 321.

Using the biological assessment EPA must review their actions to determine whether it may affect listed or proposed species or their habitats.

If EPA determines the activity or program will not affect any listed species or their habitats, consultation under Section 7a of the Act is not necessary, unless requested by the Fish and Wildlife Service. If EPA determines that the activity or program may affect listed species or their habitats, consultation is required by Section 7a of the Act with the Area Manager as provided in the Interagency Cooperation Regulations in 50 CFR Part 402.

An assessment and formal consultation are not required for those species which are not on the Federal list or currently proposed for addition to the list (species designated FPE, FPT, or SI-T in this letter). The status of these species is of concern to the Service and they may be added to the Federal list in the future. We would appreciate any efforts you may make to avoid adversely affecting them.

This letter does not constitute a consultation required by Section 7a of the Act nor a Biological Opinion of the Fish and Wildlife Service. It is intended only as a response to your request under Section 7c relative to biological assessments.

We appreciate your concerns for Endangered species and will be happy to provide any assistance that we have available on this and any future projects.

Sincerely

/s/ William C. Hickling

William C. Hickling
Area Manager

FRANK R. METTS
SECRETARY

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF TRANSPORTATION
FRANKFORT, KENTUCKY 40622

JOHN Y. BROWN, JR.
GOVERNOR

June 11, 1981

RECEIVED
JUN [illegible]
DEPT. NATURAL RES. & ENV. PROT.
POLICY & PROGRAM ANALYSIS

Environmental Review
Office of Special Projects
Department for Natural Resources and
Environmental Protection
4th Floor-Capital Plaza Tower
Frankfort, Kentucky 40601

Dear Sir:

Subject: E.I.S. 81-11
Mammoth Cave Area, Kentucky

The Kentucky Department of Transportation (KYDOT) has completed its review of the subject proposal.

KYDOT is responsible for controlling both public and private usage of right-of-way of the State road system. Any firm, individual, or governmental agency desiring access to a State road or desiring to perform any type of work on State right-of-way must obtain a permit from KYDOT. A contractor performing the work must have in his possession at all times a copy of the permit, authorization letter, and detailed drawings of work to be done.

KYDOT encourages the use of private property for placement of utility facilities where possible and practical; but we realize that in some instances, highway rights-of-way are the only reasonable places to locate the proposed utilities. In these cases, we respectfully request and require the conscientious efforts of both the applicant and the contractor to minimize any adverse effects on the roadway and on the traveling public due to construction of the applicant's project.

The following State maintained roads and maybe others may be affected by this proposal:

I-65
US 31E
US 31W
KY 70
KY 90

Cumberland Parkway
KY 218
KY 88
KY 685
KY 255

KY 259
KY 474
KY 422

Any proposed access or encroachment should be coordinated at the earliest possible stage with Joseph Kelly, Highway General Manager, P. O. Box 309, East Dixie, Elizabethtown, Kentucky 42701, phone (502) 765-4181 for Hart County, and E. V. Hilton, Highway General Manager, P. O. Box 599, Morgantown Road, Bowling Green, Kentucky 42101, phone (502) 842-0391 for the other involved counties.

Sincerely yours,

Thomas A. Scott

Thomas A. Scott, P.E.
Division of Design

TAS:dcc

2053 Oleander Dr.
Lexington, Ky 40504

June 22, 1981

John E. Hagan III, P.E.
Chief, EIS Branch
EPA, Region IV
345 Courtland St. NE
Atlanta, Ga. 30365

re: Mammoth Cave, Ky., EIS

Dear Mr. Hagan:

It is this commenter's opinion that the Mammoth Cave EIS has not adequately considered relative environmental impacts of the described alternatives and that the preferred alternative may not achieve any greater degree of protection to cave waters than one of the lowest cost alternatives.

The EIS concludes that conventional sewering and long distance transport of effluent will provide a higher degree of protection to cave waters than local disposal by land application or on-site disposal by soil absorption. But no documentation is presented of any cave damage caused by well designed and installed septic tank systems. Likewise, no data are presented on the probable percolate quality from land application systems. Such data are available from other sources.

The EIS completely ignores the problem of leaking sewer systems. Sewer systems commonly leak, particularly in unsaturated zones such as karst limestone. Neither Infiltration-Inflow Studies nor Sewer System Evaluation

Surveys will normally report leaks from sewer systems into groundwater. Case in point: one of Kentucky's largest cities is built on Karst limestone. Personal communication with one of the fieldmen doing the SSES for that city revealed many leaks from the sewers were noticed during the SSES, but none were reported. One leak was reported to be 50,000 gpd and was located in a fairly recent part of the system.

Others have reported leaks from sewers in karst areas, i.e. The Hydrology of the Lexington and Fayette County, Kentucky, area by USGS, 1968, page 17:

> "For instance, many sewer lines in Lexington are laid within the upper few feet of bedrock. Leakage from these lines enters the underlying water body almost immediately. Hopkins (1963) estimated the leakage from sanitary sewers in the Lexington area is substantial after heavy rains, perhaps as much as 4 or 5 times the normal inflow of 8.5 mgd at the Lexington sewage treatment plant in 1962. Thus, a large amount of bacteria laden water is flowing in the bedrock and undoubtedly, so some of this water mixes with the natural groundwater."

This hazard to cave waters (from leaking sewers) should be given considerable weight in the EIS. In the Mammoth Cave area the effects of sewer leaks at present may be partly masked by the effects of direct connections to the cave system.

Little or no weight is placed on impacts of urban runoff on the cave waters. Runoff could have enough impact to degrade the cave waters far beyond the effect of percolate from properly managed land application systems. No attempt was made or documented for calculating mass balances of cave basin pollutants. In contrast, the 7 lakes EIS found that, normally, the effects of pollutants from septic tank systems were insignificant compared to other non-point sources, even where septic tank installation violated state standards for separation distances from groundwater. (2)

After giving adequate consideration to these additional factors, one of the more affordable alternatives may be selected. It would be an injustice to select an excessively costly alternative only to find cave waters remained degraded.

Yours sincerely,

Jack L Abney

Jack L. Abney
Environmental Planner

JLA/jrm

cc: Larry Silverman, ACWA
James Kreissl, EPA
Keith Derth, EPA

References

1. Pitt, Wm. A., Harold C. Mattraw, Jr. and Howard Klein. "Ground-Water Quality in Selected Areas Serviced by Septic Tanks, Dade County, Florida." 1975 Open file report 75-607. US Geological Survey, 901 S. Miami Ave., Miami, Florida.

2. *Environmental Impact Statement*. *Alternative Waste Treatment Systems for Rural Lake Projects - Case Study Number 1, Crystal Lake Area, Benzie County, Michigan*. US Environmental Protection Agency, Region V, 230 S. Dearborn St., Chicago, Ill.

3. Rajagopal, R., R.L. Patterson, R.P. Canale and M.J. Armstrong. "Water Quality and Economic Criteria for Rural Wastewater and Water Supply Systems," J. Water Pollution Control Fed. 47(7). (July 1975).

4. *Report to Congress - Waste Disposal Practices and Their Effect on Ground Water*. January 1977. U.S. Environmental Protection Agency, Office of Water Supply and Office of Solid Waste Management Programs, Washington, D.C. 20460.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-81/970

JUN 29 1981

Mr. John E. Hagan, III
Chief, EIS Branch, Region IV
Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Hagan:

The Department of the Interior has reviewed the draft environmental statement for Wastewater Facilities for the Mammoth Cave Area, Edmonson, Barren and Hart Counties, Kentucky and, in general, we favor implementation of Alternative 2. The following are our specific concerns and comments on the impact statement.

Endangered Species

As the document presently stands, the endangered species sections of the EIS are inadequate as they relate to the Endangered Species Act's requirements for a biological assessment. This fact, however, does not mean the EIS must be delayed pending a completed biological assessment.

As discussed in a June 3, 1981, phone conversation between our Fish and Wildlife Service and Environmental Protection Agency staffs, the biological assessment does not need to be incorporated into the EIS. Therefore, the collection of data for specific endangered species concerns could be delayed. This delay is allowable under the Act as long as there are no irreversible or irretrievable commitments of resources which would deny the formulation or implementation of reasonable alternatives regarding the Environmental Protection Agency's actions. The EIS should, however, address the fact that Section 7 responsibilities will be fulfilled through the consultation process. Our specific Section 7 concerns will be addressed in a letter from our Fish and Wildlife Service's Asheville Area Office.

On page III-41, item 12, paragraph 1, line 1, we wish to point out that not all rare and endangered flora and fauna of the Commonwealth of Kentucky are currently protected by Federal legislation. Candidate plant species have no Federal protection at present and will not unless listed. There are other species within the State that, although rare, may never be proposed for Federal protection. In the same item, paragraph 2, line 10, it should be noted that the three categories that you address here refer to the Smithsonian Institution's list of threatened plants, not endangered species in general.

National Parks
Our National Park Service has contracted with Scruggs and Hammond, Inc. to conduct a sewerage study for Mammoth Cave National Park. The results of this study when completed will form the basis of the National Park Service's decision regarding wastewater management.

We do wish, however, to express support for any upgrading of local wastewater management facilities that will prevent future pollution of the cave system.

Cultural Resources
We note that the Kentucky Heritage Commission has recommended that a cultural resource survey of the project area be conducted. We concur with this recommendation since numerous historic and archeological resources are known in the area, and we look forward to seeing the results of the survey. The State Historic Preservation Officer should be afforded an opportunity to review and comment on the survey report and should be consulted on the adequacy of any proposed mitigation measures. If any cultural resources meeting National Register criteria are to be affected, the Advisory Council on Historic Preservation must also be afforded an opportunity to comment.

Cultural resource surveys are required by Section 110(A)(2) of the National Historic Preservation Act, as amended. The Advisory Council on Historic Preservation implementing procedures for this Act are found in 36 CFR 800.

Water Resources
It is stated that, "No surface runoff reaches the river" (page III-13, paragraph 3) in reference to Green River. That statement appears to be in need of qualification in view of the large folded map of Groundwater Basins in the Mammouth Cave Region, Kentucky, which shows a considerable number of streams reaching the north side of Green River in the northwestern part of Mammoth Cave National Park.

Thank you for the opportunity to comment on this impact statement.

Sincerely,

CECIL S. HOFFMANN
Special Assistant to
Assistant SECRETARY

Jackie Swigart
Secretary

John Y. Brown, Jr.
Governor

COMMONWEALTH OF KENTUCKY
DEPARTMENT FOR NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER
CENTURY PLAZA
1065 U.S. 127 BYPASS SOUTH
FRANKFORT, KENTUCKY 40601

MEMORANDUM

TO: Environmental Review Officer
Office of Special Projects

THRU: Thomas L. Grissom
Director
Division of Water

FROM: T. James Fries, Chief T. James Fries
Planning and Standards Branch

DATE: June 22, 1981

SUBJECT: Mammoth Cave Area Wastewater Treatment Facilities DEIS, EIS 81-11

Attached are the Division of Water's comments on the draft Environmental Impact Statement on the Mammoth Cave Area Wastewater Treatment Facilities, EIS 81-11.

TJF:TK:jdb

Attachments

DNREP ENVIRONMENTAL REVIEW

Division of Water

Project Number: 81-11

Project Title: Draft EIS Mammoth Cave Area Wastewater Treatment Facilities.

The Division of Water's comments on this draft Environmental Impact Statement address aquatic habitat and wastewater treatment.

AQUATIC HABITAT

Technical Reference Document Volume I

1. Page I-50, paragraph 2. A statement reads: "Ratios greater than 1 usually indicate that the source of pollution is from man." This statement is not true as written. Ratios greater than 4:1 usually indicate human sources of pollution. Ratios less than 0.7 usually indicate animal sources. However, ratios between 0.7 and 4.0 are not definitive and should not be relied upon since this is a gray area and may indicate mixed sources.

References: Microbiological Methods for Monitoring the Environment, EPA-600/8-78-017, page 145.

2. The following corrections are needed:

a. Fish Species List:

Page AI-15. Notropis conutus chrysocephalus (Rafinesque) central common shiner should be Notropis Chrysocephalus (Rafinesque) striped shiner.

Page AI-15. Chromsonus Erythrogaster (Rafinesque) redbelly dace should be Phoxinus erythrogaster (Rafinesque) southern redbelly dace.

Page AI-16. Family Amolyopsidae:

"Karst springfish" should be "Spring cavefish"
"Lesser blindfish" should be "Southern cavefish"
"Mammonth cave blindfish" should be "Northern cavefish"

Page AI-17. Percina uranidea (Jordan & Gilbert) Stargazing darter should be Percina ouachitae (Jordan & Gilbert) saddleback darter. Percina uranidea occurs only west of the Mississippi River.

b. Mussel Species List:

Page AI-19. Cumerlandia monodonta should be Cumberlandia monodonta.

Strophitus undulatus undulatus "square foot" should be "squaw foot".

Carunculna parva and Toxolasma parva are the same. Should be Carunculina parva.

Dysnomia Triquetra and Epiolasma [SIC] triquetra are the same and should be Plagiola triquetra.

Epiolasma [SIC] sulcata sulcata should be Plagiola sulcata.

Potamilus alatus is the same as Proptera alata.

Potamilus laevissimus should be Leptodea laevissima.

Page AI-20. Ptycholbranchus fasciolare should be Ptychobranchus fasciolare.

Anblema costata is the same as Anblema plicata plicata.

Fusconaia ebeng should be Fusconaia ebenus.

Megalonqius nervosa is the same as Megalonaias gigantea which is the proper spelling.

Quadrula guadrula should be Quadrula quadrula.

WASTE WATER TREATMENT

I. The following corrections are needed:

1. DRAFT

a. III-15 and III-16, Groundwater Quality Standards.

This paragraph cites Kentucky Water Quality Standards as found in 40 CFR § 120.21 [SIC]. The date of this document is April 7, 1980, and it is signed by Regional Administrator Hanmer. In a letter dated May 7, 1980, Regional Administrator Hanmer approved the Kentucky Standards promulgated December 5, 1979 (See 401 KAR 5:031, 6 Ky. Reg. 344). The withdrawal of 40 CFR § 120.27 was made final on December 3, 1980 (see 45 Fed. Reg. 59598). 401 KAR 5:031 § 5, Aquatic Life, should have been cited. The Kentucky Division of Water questions the citing of the outdated standards eleven months after the Regional Administrator approved the new standards.

b. II-22. Table III-5 exhibits "Red Book" criteria. This table should display Kentucky's current water quality standards as found in 401 KAR 5:031. Attached is a copy of this table which has been corrected to show the applicable standards.

2. TECHNICAL REFERENCE DOCUMENT VOLUME II

a. II-15, Treatment and Discharge to the Groundwater. The Commonwealth has approved the effluent limits of the subsurface discharges in this area. The Kentucky Division of Water and the U.S. EPA conducted independent evaluations of the waste load allocations for the subject publicly owned treatment works. The U.S. EPA results were submitted to the Kentucky Division of Water in November 10, 1980, letter from Robert F. McGhee, Chief, Water Quality Standards Section, U.S. EPA Region IV. These results were not in complete agreement with Kentucky's findings. Due to insufficient justification at that time, the Kentucky Division of Water rejected the more stringent effluent limitations based on a proposed Outstanding Resource Water designation and associated 6.5 mg/l dissolved oxygen criterion. However, in the Division's letter to Mr. McGhee on December 10, 1980, the Division concurred with EPA's effluent limits based on the protection of the current warmwater aquatic habitat designation and associated 5.0 mg/l dissolved oxygen criterion. (See attached letters.)

The eventual effluent limitations utilized for evaluating the alternatives correlate closely with the numbers agreed on by the Division and EPA. As a result, comparison of alternatives in this draft EIS based on necessary levels of wastewater treatment should be valid.

II. The following question is raised:

1. DRAFT

a. Page ix. What is the cost difference between upgrading the Horse Cave and Cave City wastewater treatment plants versus constructing a new oxidation ditch at each city's facility?

T. James Fries, Chief
Planning and Standards Branch
Division of Water

7/07/81
DATE

TABLE III-5

EPA CRITERIA FOR SELECTED WATER QUALITY PARAMETERS FOR USE CLASSIFICATIONS OF AQUATIC LIFE, DRINKING WATER AND SECONDARY CONTACT

Parameter	Use Classification Aquatic Life	 Raw Drinking Water	 Secondary Contact
Ammonia	[redacted] ~~.02 mg~~/1 (as un-ionized ammonia)	-	-
Chromium	.1 mg/1	.05 mg/1	-
Fecal Coliform	-	-	[redacted] ~~200~~/100 ml (log mean)
Chlorides		250 mg/1	-
Copper	[redacted] .1 times 96-hr LC 50 for resident species	1 mg/1	-
Iron	1.0 mg/1	[redacted] [redacted]	-
Lead	.01 times 96-hr LC 50 for resident species	.05 mg/1	-
Nickel	.01 times 96-hr LC 50 for resident species	-	-
Nitrates	-	10 mg/1 (NO_3-N)	-
Dissolved Oxygen	≥5 mg/1	-	-
pH	[redacted] ~~6.5~~ - 9.0	[redacted]	[redacted]
Total Dissolved Solids	-	[redacted] ~~250 mg~~/1 for chlorides and sulfates	-
Sulfates	-	250 mg/1	-
Sulfides	[redacted] 2 ~~m~~g/1 undissociated H_2S	-	-
Zinc	.01 times 96-hr LC 50 for resident species	5 mg/1	-

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ackie Swigart
Secretary

John Y. Brown, Jr
Governor

COMMONWEALTH OF KENTUCKY
DEPARTMENT FOR NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER
CENTURY PLAZA
1065 U.S. 127 BYPASS SOUTH
FRANKFORT KENTUCKY 40601

December 10, 1980

Robert F. McGhee, Chief
Water Quality Standards Section
United States Environmental Protection Agency
Region IV
345 Courtland St.
Atlanta, GA. 30365

Dear Mr. McGhee:

The Division of Water concurs with EPA's most recent wasteload allocations for POTW effluents to the Hidden River based on protection of the current warmwater aquatic habitat designation and associated 5.0 mg/l minimum daily average dissolved oxygen concentration. We do not concur with the alternative effluent limits based on the proposed outstanding resource waters designation and associated 6.5 mg/l dissolved oxygen. The Cave Research Foundation's outstanding resource waters designation petition proposed this criteria for a 40 mile segment of the Green River and not the Hidden River system. We have received no proposed criteria nor supporting documentation for the underground streams in the Mammoth Cave area.

In the absence of verifying documentation for determining the geographic scope and associated criteria for the outstanding resource waters designation, the State can take no action on the reclassification proposal. We support your contention that the wasteload allocations generated from the latest modeling efforts are sufficient to compare 201 alternatives. We hope that our concurrence in this matter will result in the timely completion of the EIS and 201 Plan to the mutual satisfaction of all concerned parties.

If you should have any questions regarding our activities in this area, please contact Bob Ware at 502/564-7793.

Sincerely,

Thomas L. Grissom
Director
Ky. Division of Water

TLG:bjm

cc: Bob Ware
KY. Division of Water

Jim Fries
KY. Division of Water

Ron Mikulak, EPA

Kip Duchon, CRF

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

NOV 10 1980

REF: 4W-WQ

Bob Ware
KDNREP
Century Plaza
1065 U.S. 127 By-Pass South
Frankfort, KY 40601

Dear Bob:

Enclosed is a summary of recent EPA modeling for the Hidden River in Kentucky. The model we have applied is a steady state, one dimensional, modified Streater-Phelps model, developed for simulating water quality in free-flowing streams. Based on the limited data available, the model appears to reasonably predict the observed water quality dynamics occurring within the Hidden River system. After the model was calibrated, effluent limitations for various wastewater treatment alternatives were established. We did not see a basis for seasonal effluent limits, so none were developed. The effluent limits developed from this model are somewhat more stringent than those proposed by KDNR, however, as a result of our meeting on October 9 and subsequent discussions, the model is now acceptable to both EPA and KDNR. The alternatives for which effluent limits were computed include the proposed Outstanding Resource Waters designation and associated 6.5 mg/l dissolved oxygen standard. Unless the State takes some action soon on that proposal, unnecessary delays in the 201 process will likely occur. We strongly encourage the State to take action on the proposed designation.

We do agree with you that the Hidden River is a very complex environmental system and the applicability of a free-flowing stream model is uncertain even though the model does reasonably predict actual water quality. However, we believe that wasteload allocations developed from the model are sufficient to compare 201 alternatives.

We request your prompt concurrence with the enclosed waste load allocations so that our respective facilities planning staffs can take the actions necessary to insure completion of the EIS and 201 Plan during FY 81.

Sincerely yours,

R F McGhee

Robert F. McGhee, Chief
Water Quality Standards Section

Enclosure

cc: Kip Duchon
James Quinlan

Jackie Swigart
Secretary

John Y. Brown, Jr.
Governor

COMMONWEALTH OF KENTUCKY
DEPARTMENT FOR NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION
OFFICE OF THE SECRETARY
OFFICE OF SPECIAL PROJECTS
CAPITAL PLAZA TOWER
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-7320

July 2, 1981

Mr. John Hagan, III, Chief
EIS Branch
EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Subject: DEIS - Mammoth Cave Area Wastewater Facilities

Dear Mr. Hagan:

Enclosed for your information and use are copies of all comments received by this Office, acting as the State Clearinghouse for environmental impact statements, from Kentucky Environmental Review Agencies concerning the Draft Environmental Impact Statement (DEIS) for Mammoth Cave Area, Kentucky wastewater treatment facilities.

These comments should be appropriately considered in accordance with the National Environmental Policy Act (NEPA) and associated regulations in preparing the final environmental impact statement.

Sincerely,

Don Beevers
Assistant Administrator
Office of Special Projects

DB:kp

Enclosure

VIII. LIST OF PREPARERS

Project Personnel

U.S. Environmental Protection Agency

Robert B. Howard	Chief, EIS Preparation Section
Richard D. Green	EIS Project Officer (1977-1979)
Ronald J. Mikulak	EIS Project Officer (1979-present)
Peter T. McGarry	Chief, North Carolina/Kentucky Facilities Planning Section

Consultants

Gannett Fleming Corddry and Carpenter, Inc.

Thomas M. Rachford	Senior Project Manager
Richard N. Koch	Project Manager
Lynette J. Deuel	Environmental Scientist
Jeffrey G. Wendle	Project Engineer
Michael S. Moulds	Assistant Project Engineer

Claude Terry and Associates, Inc.

Claude E. Terry	Project Executive
Robert J. Hunter	Project Manager
James C. Hodges	Environmental Scientist
Virginia Hayles	Environmental Scientist
Louise B. Franklin	Environmental Planner